

FIGURE 1A

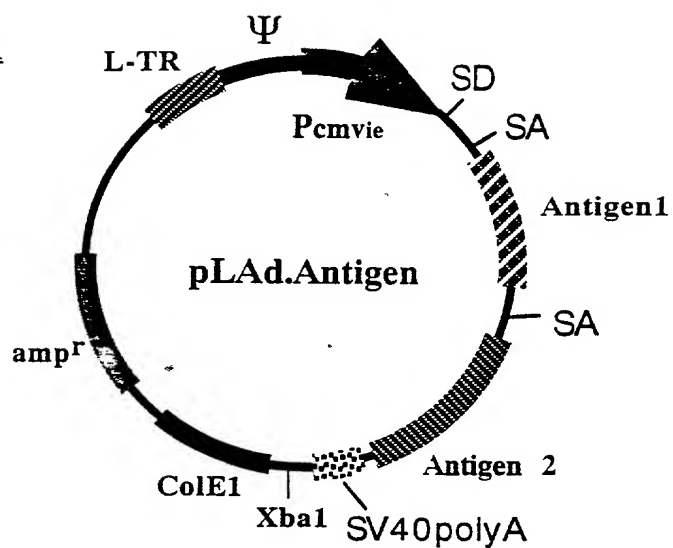


FIGURE 1B

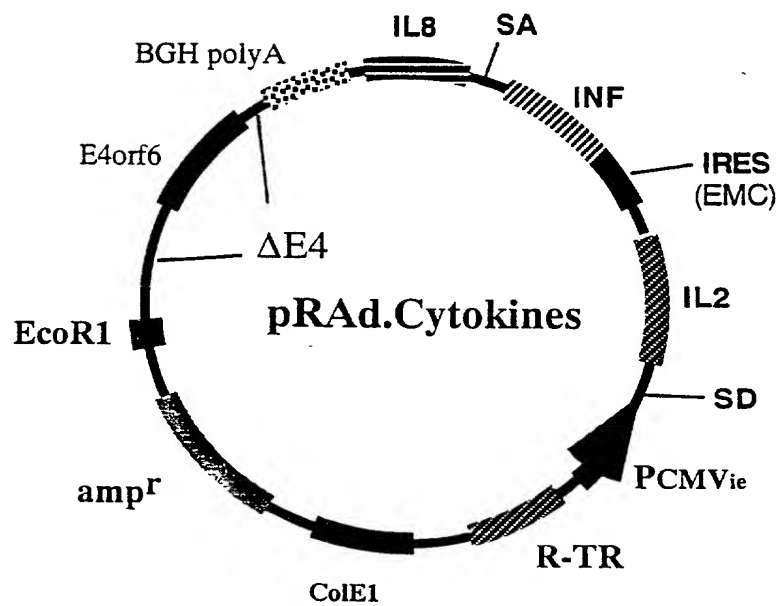


FIGURE 1C

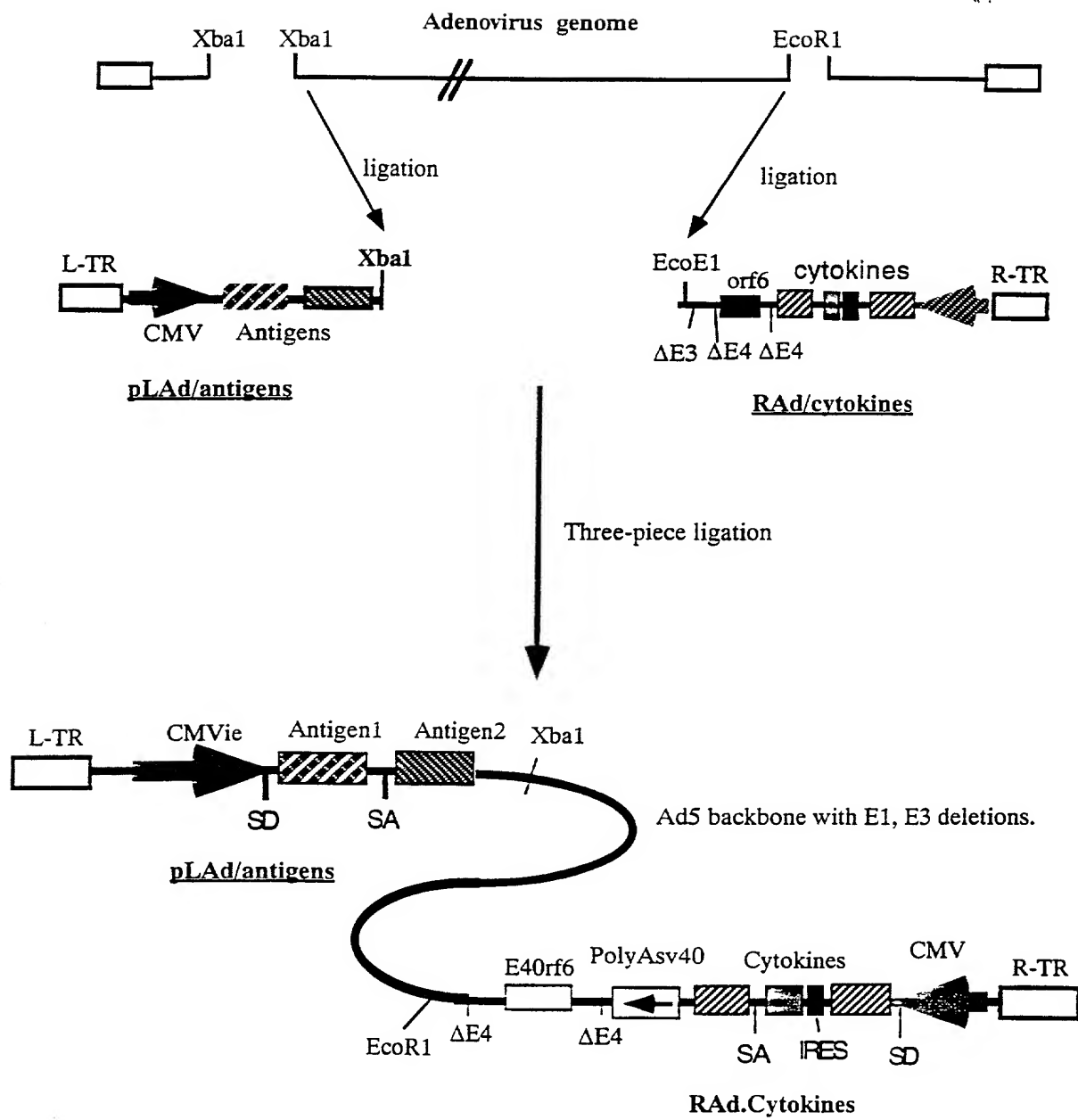
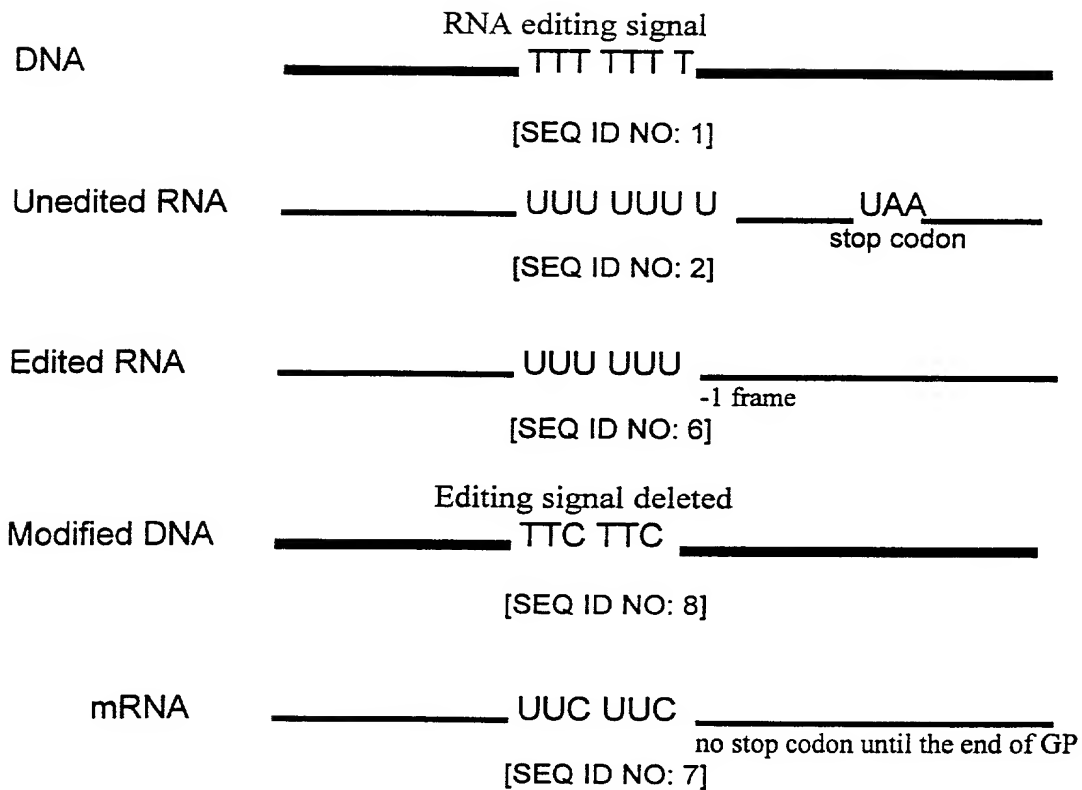


FIGURE 2



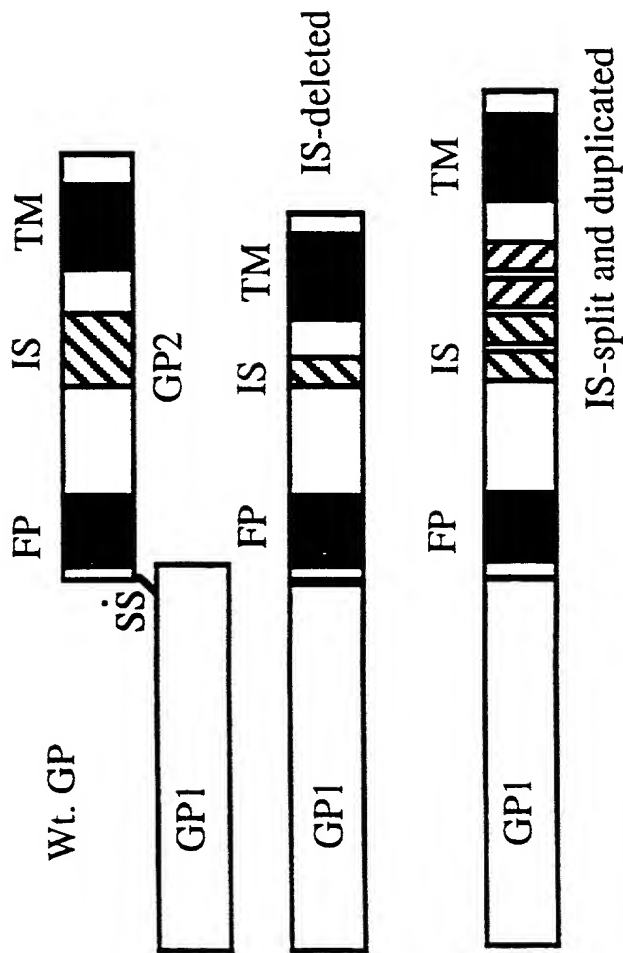


FIGURE 3A

FIGURE 3B

FIGURE 3C

FIGURE 4A

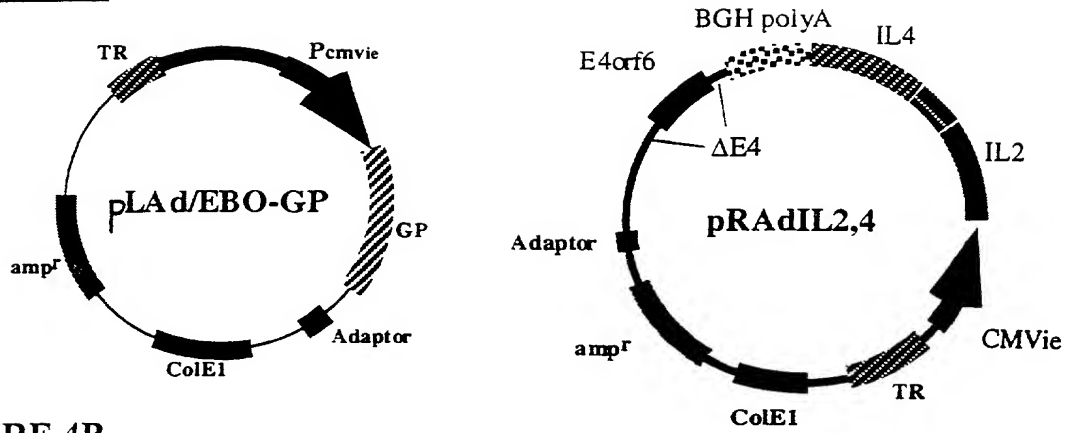


FIGURE 4B

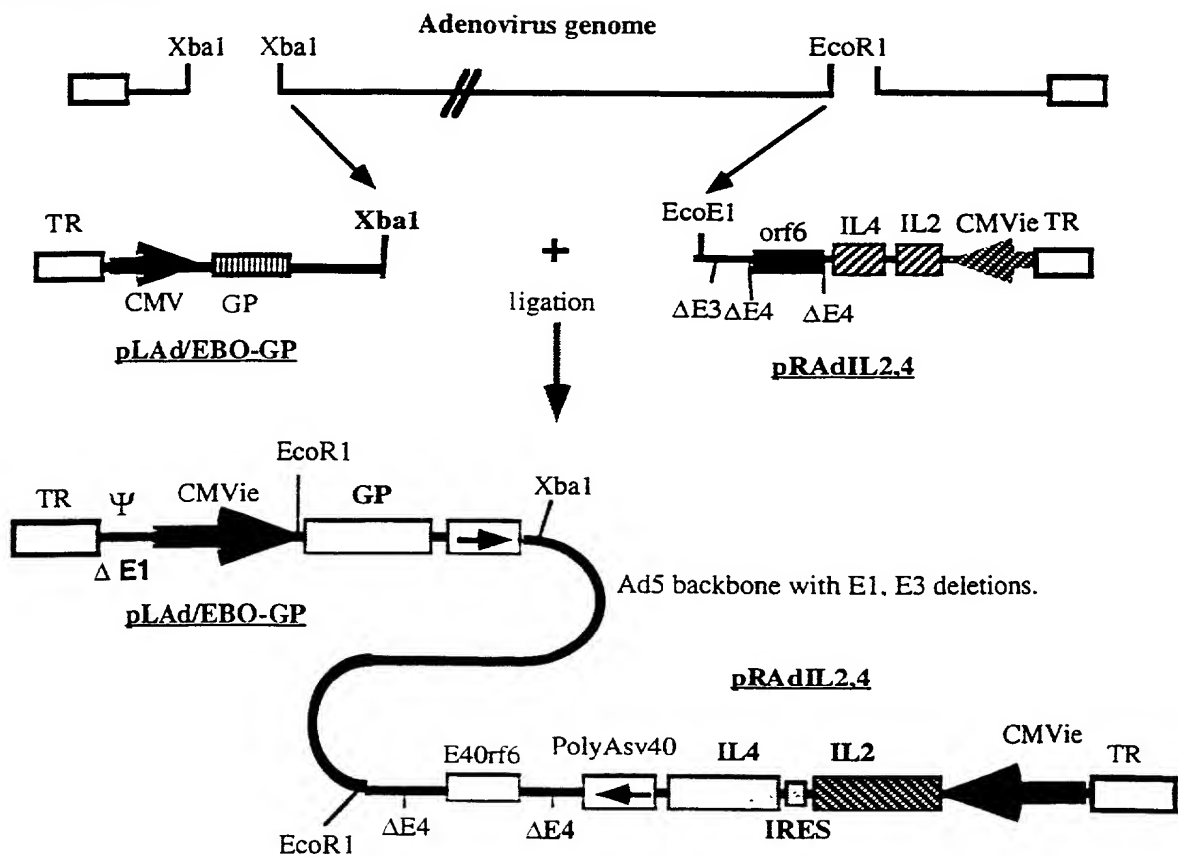
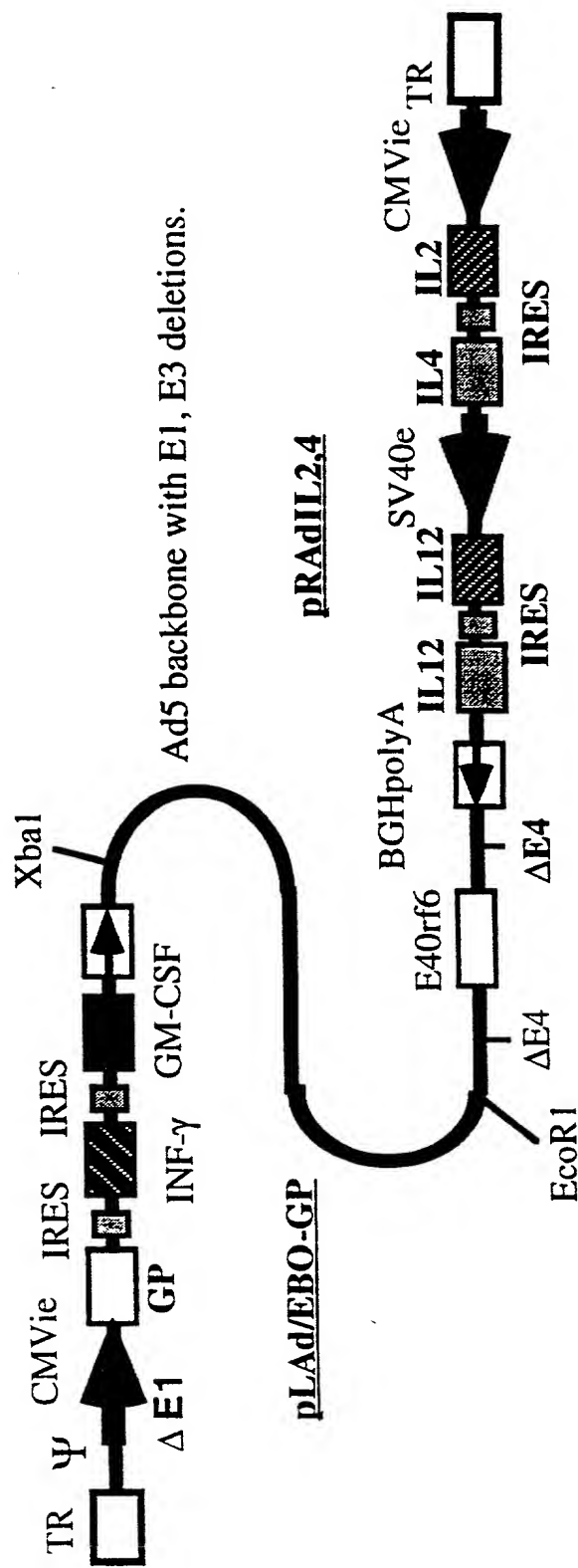


FIGURE 5



Anti-HIV (tat,env) relative titer
(Group 3)

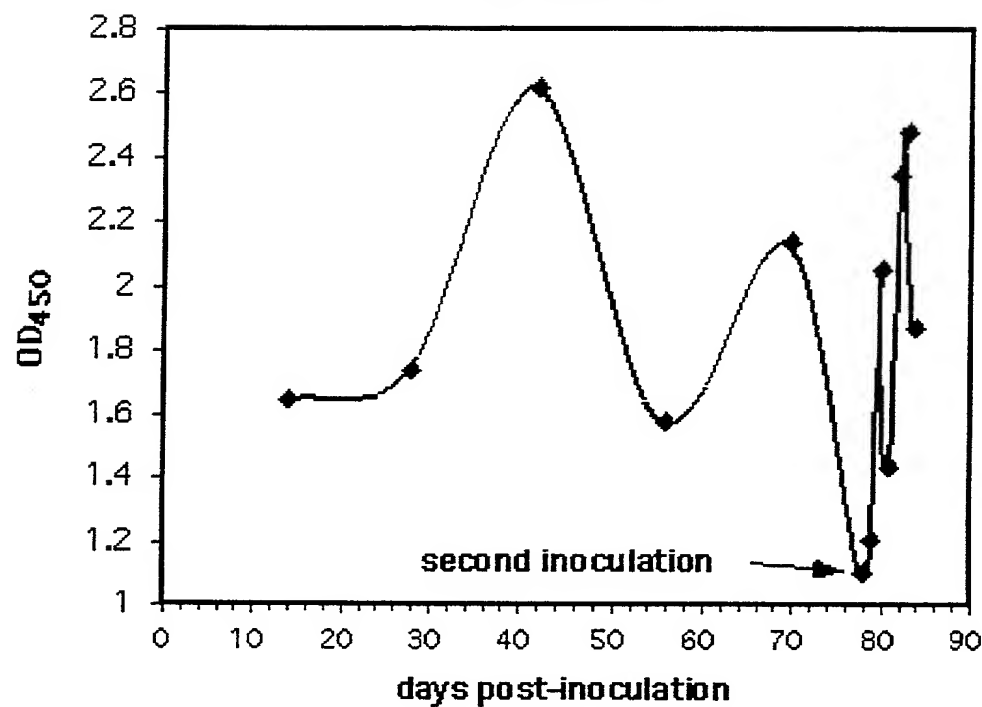


FIGURE 6

Anti-HIV (tat,env) relative titer
(Group 4)

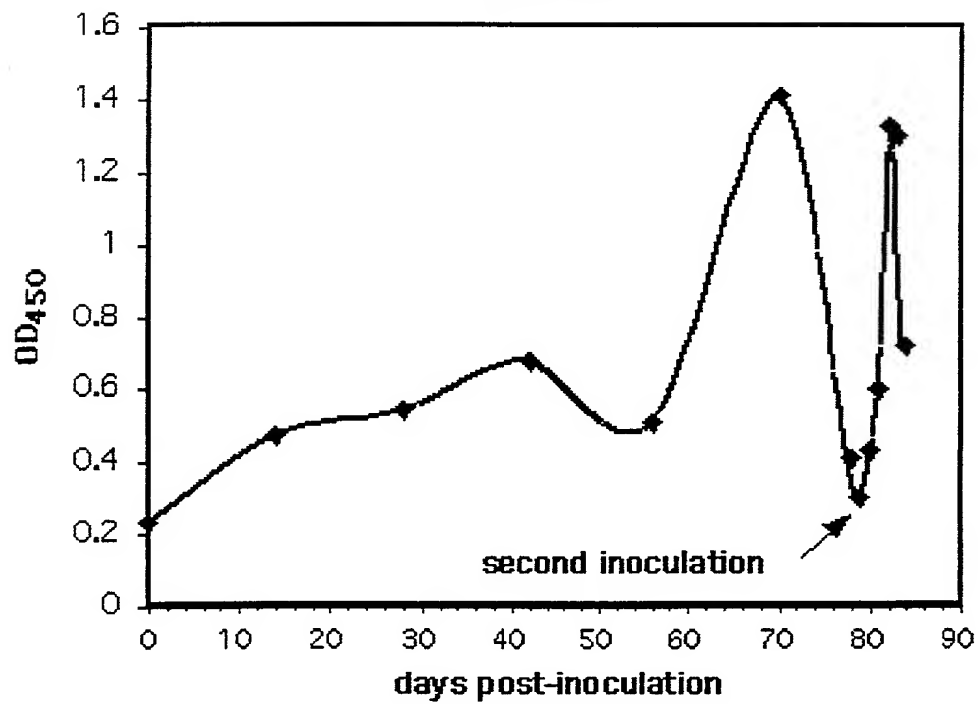


FIGURE 7

IFN γ secretion from activated splenocytes in response to target cell stimulation

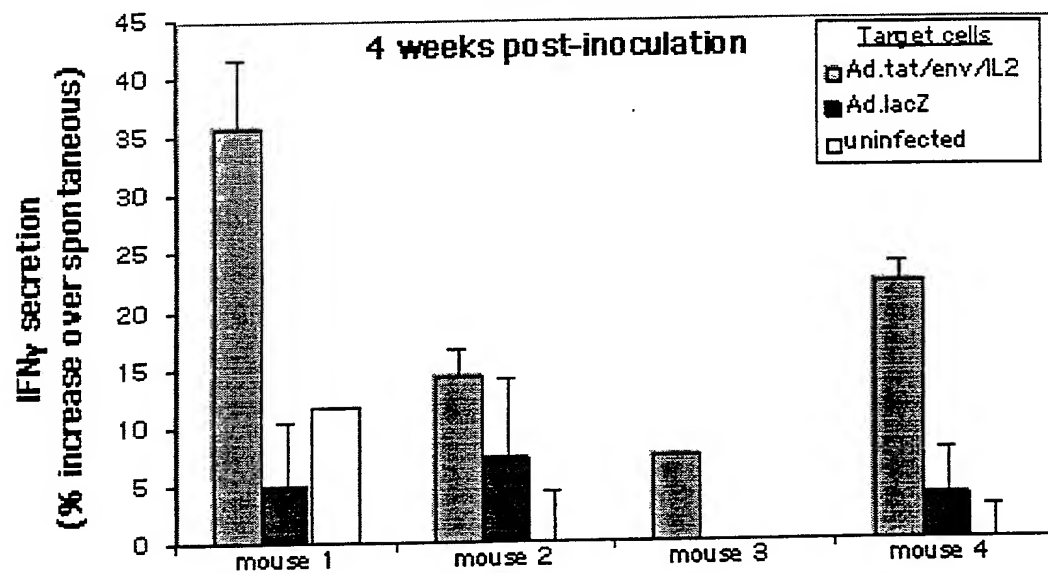


FIGURE 8A

IFN γ secretion from activated splenocytes in response to target cell stimulation

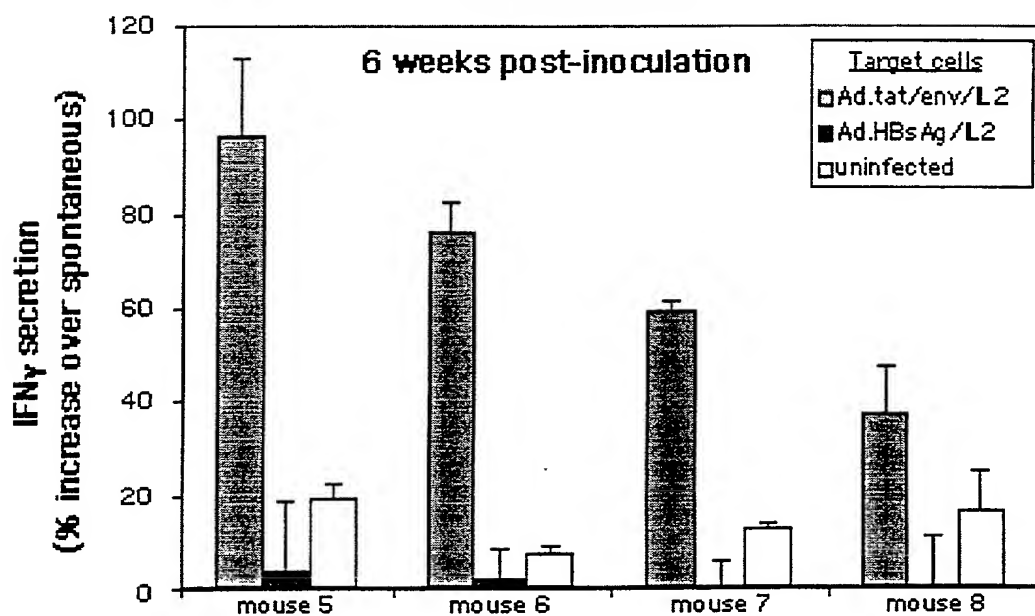


FIGURE 8B

IFN γ secretion from activated splenocytes in response to target cell stimulation

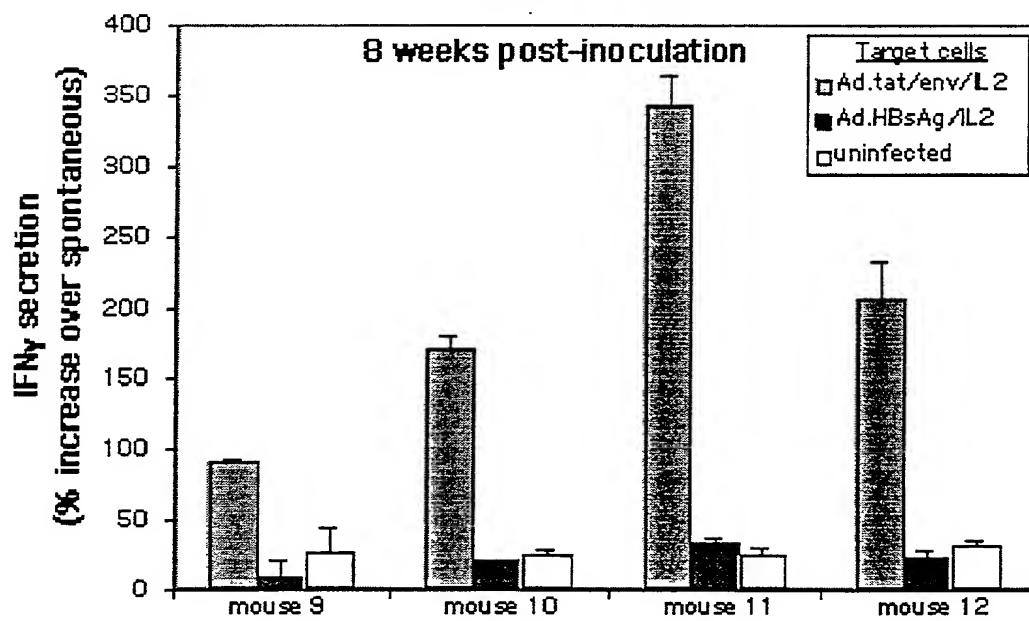


FIGURE 8C

Granzyme A secretion from activated splenocytes in response to stimulation with target cells

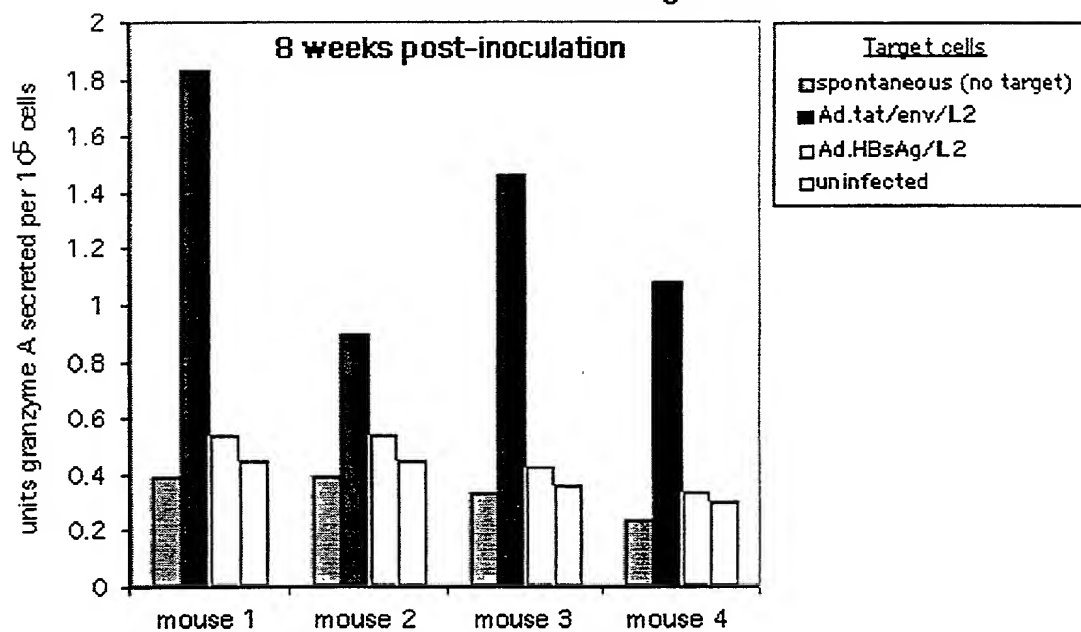


FIGURE 9

Anti-HBsAg relative titer
(Group 1)

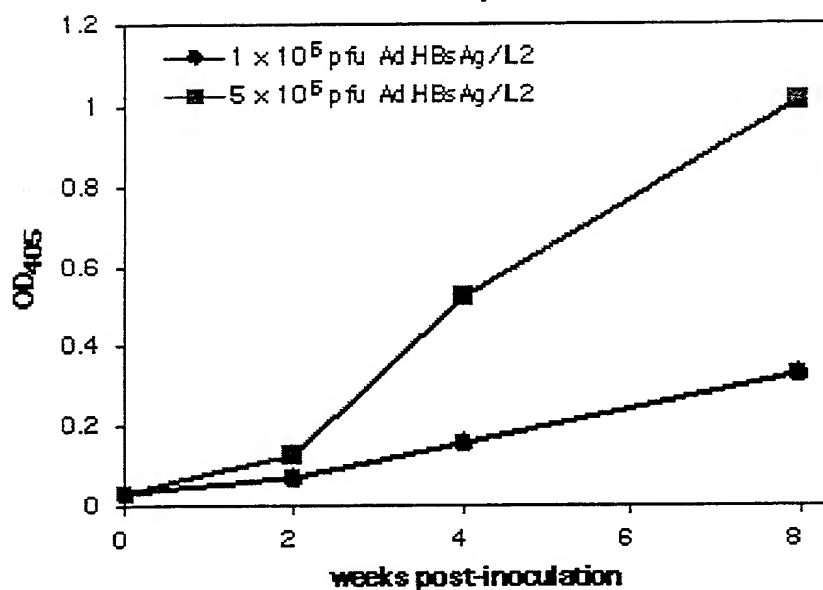


FIGURE 10A

Anti-HBsAg relative titer
(Group 2)

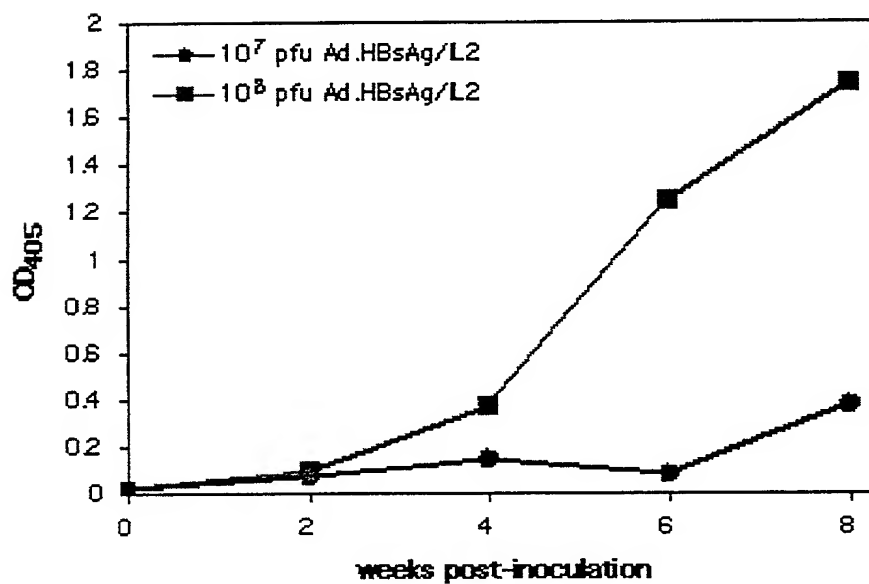


FIGURE 10B

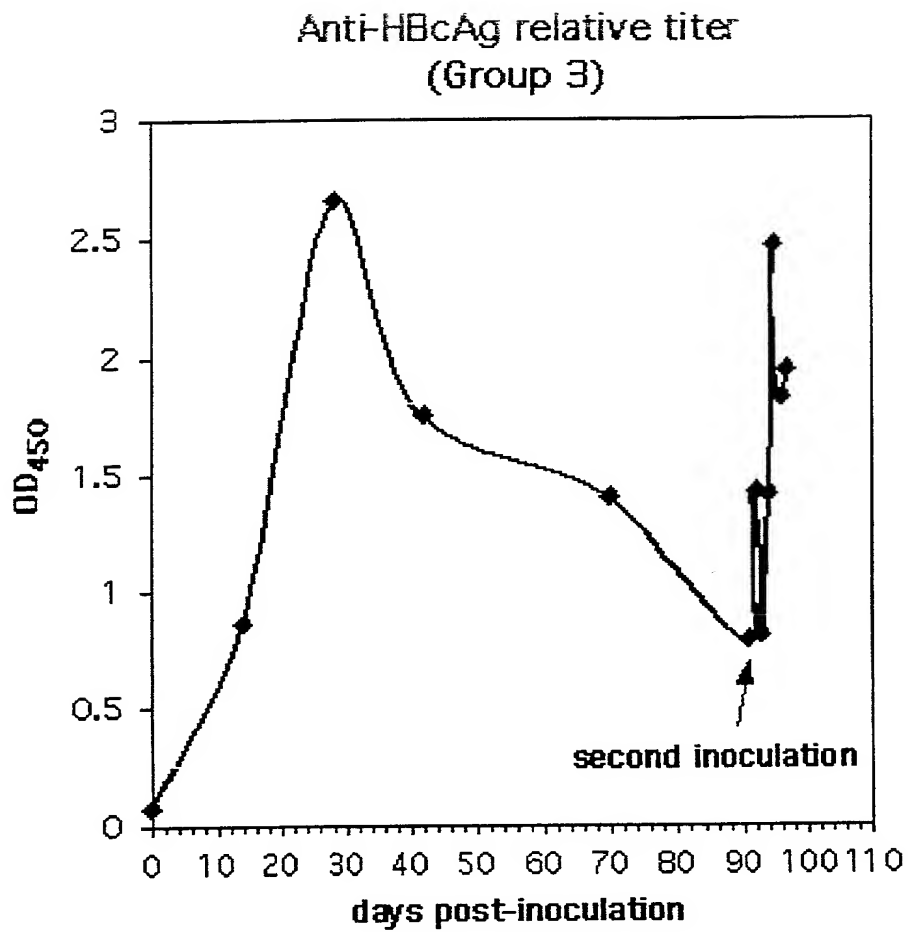


FIGURE 11A

Anti-HBcAg relative titer
(Group 4)

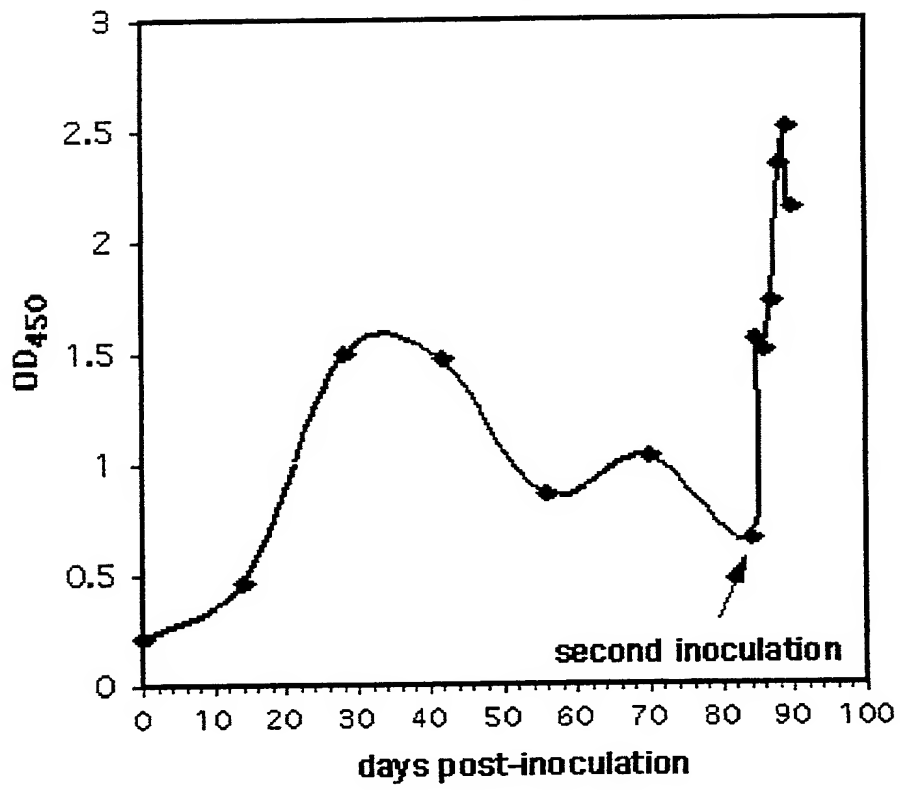
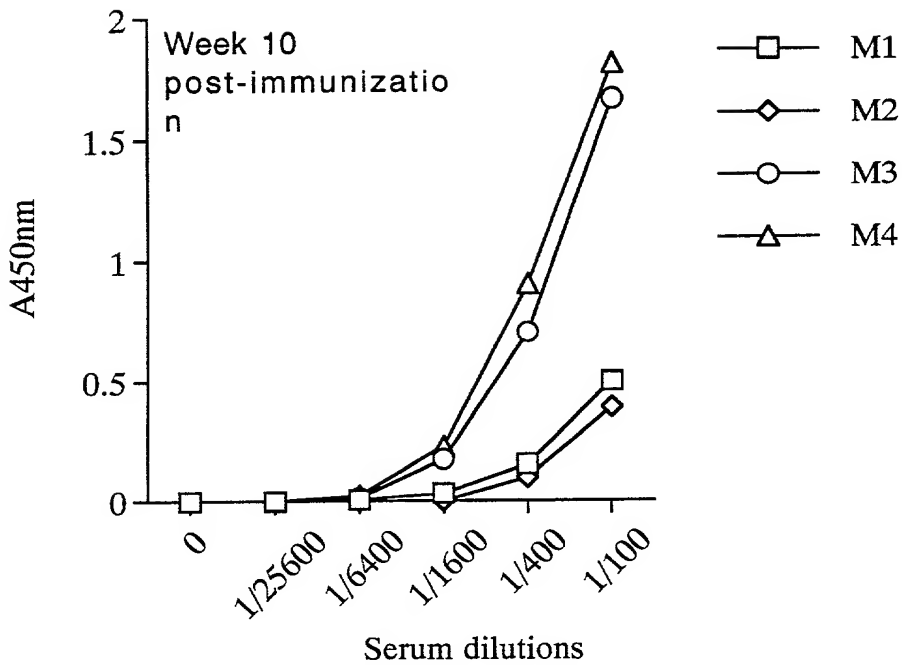


FIGURE 11B

FIGURE 12

A.



B.

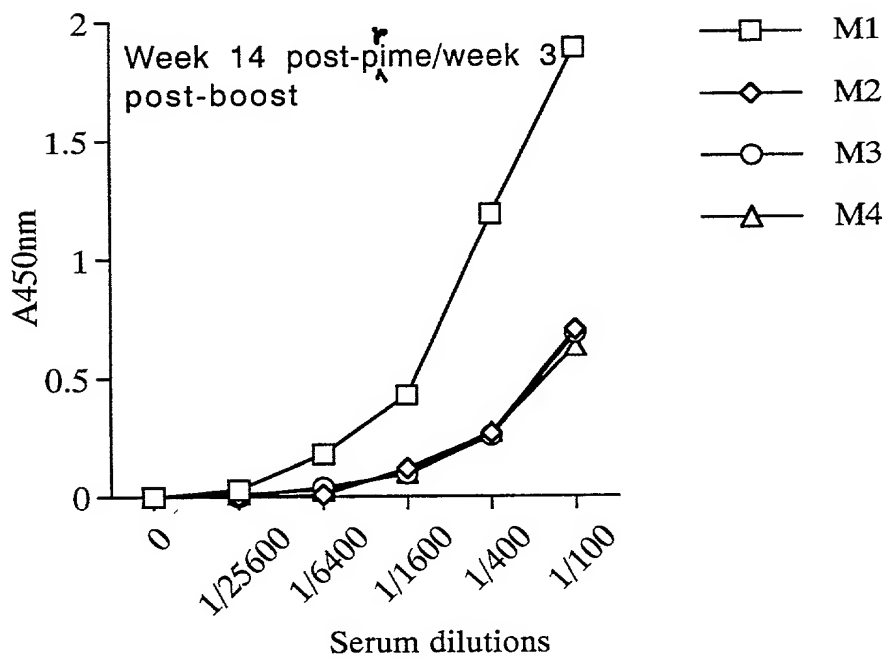


FIGURE 13

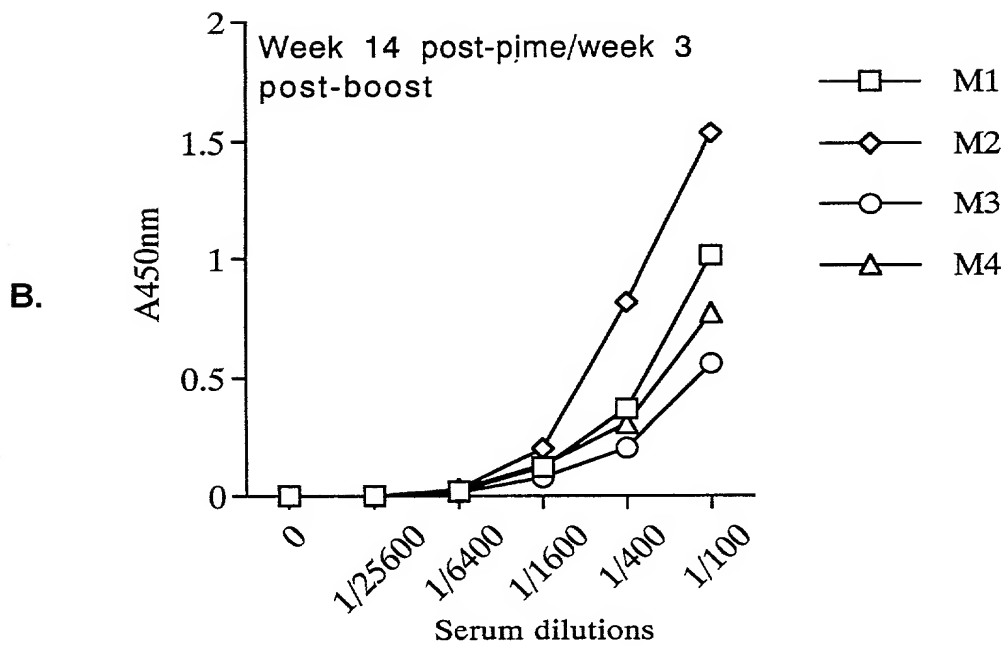
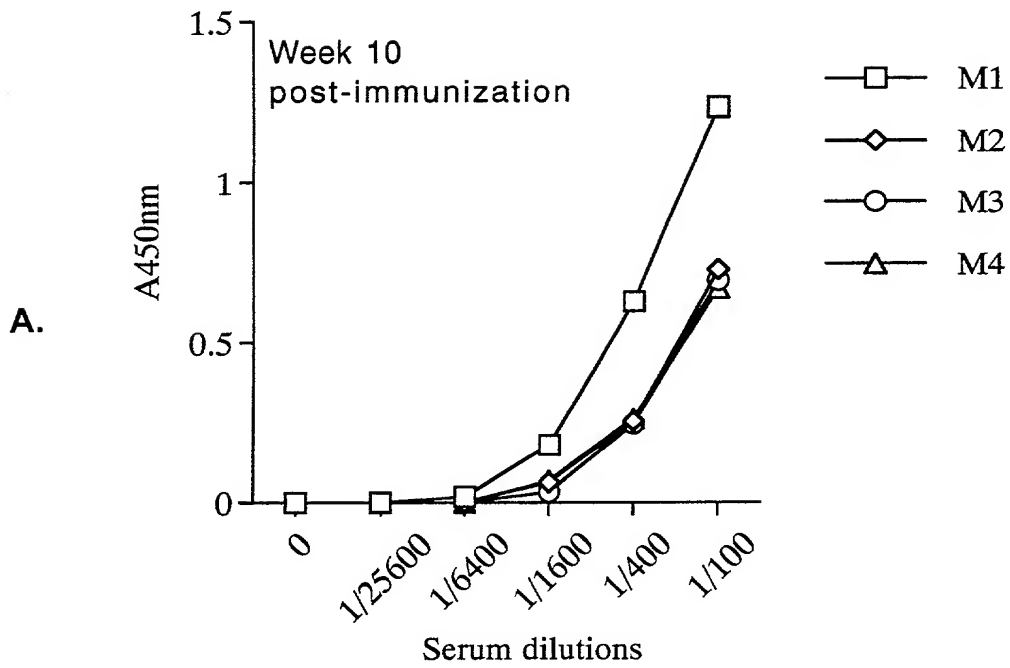
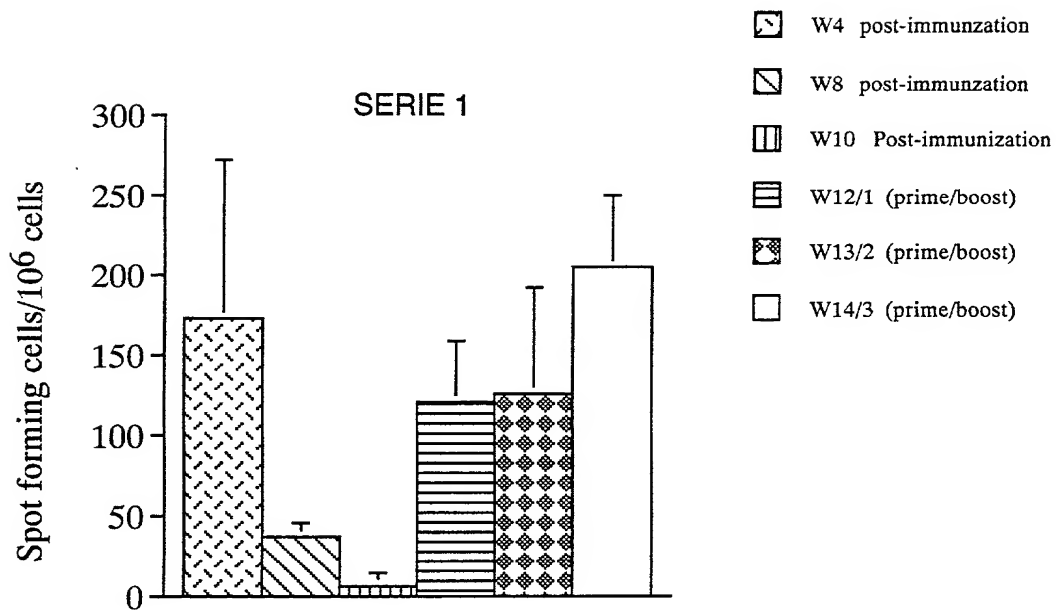


FIGURE 14

Gag-specific IFN γ secreting splenic cells
after immunization of mice with Ad(3C,
Gag, Env)

A.



B.

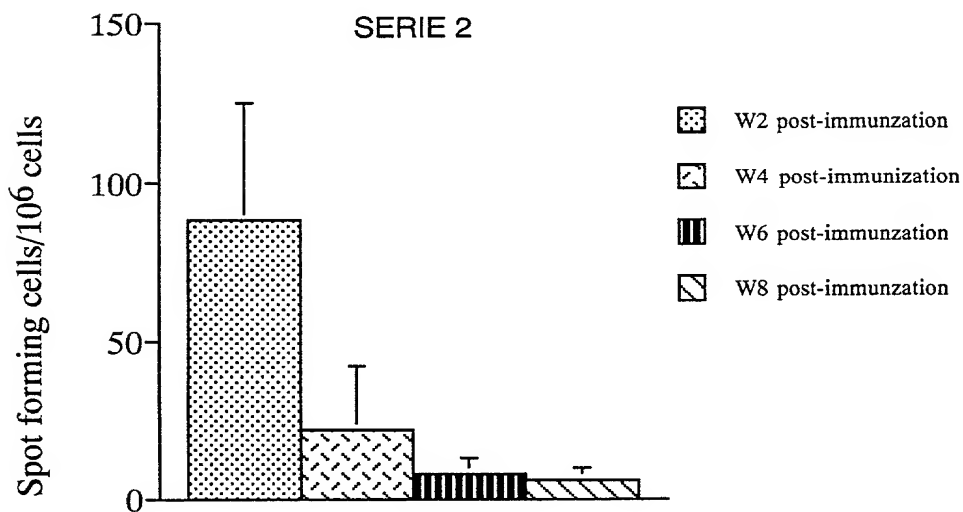
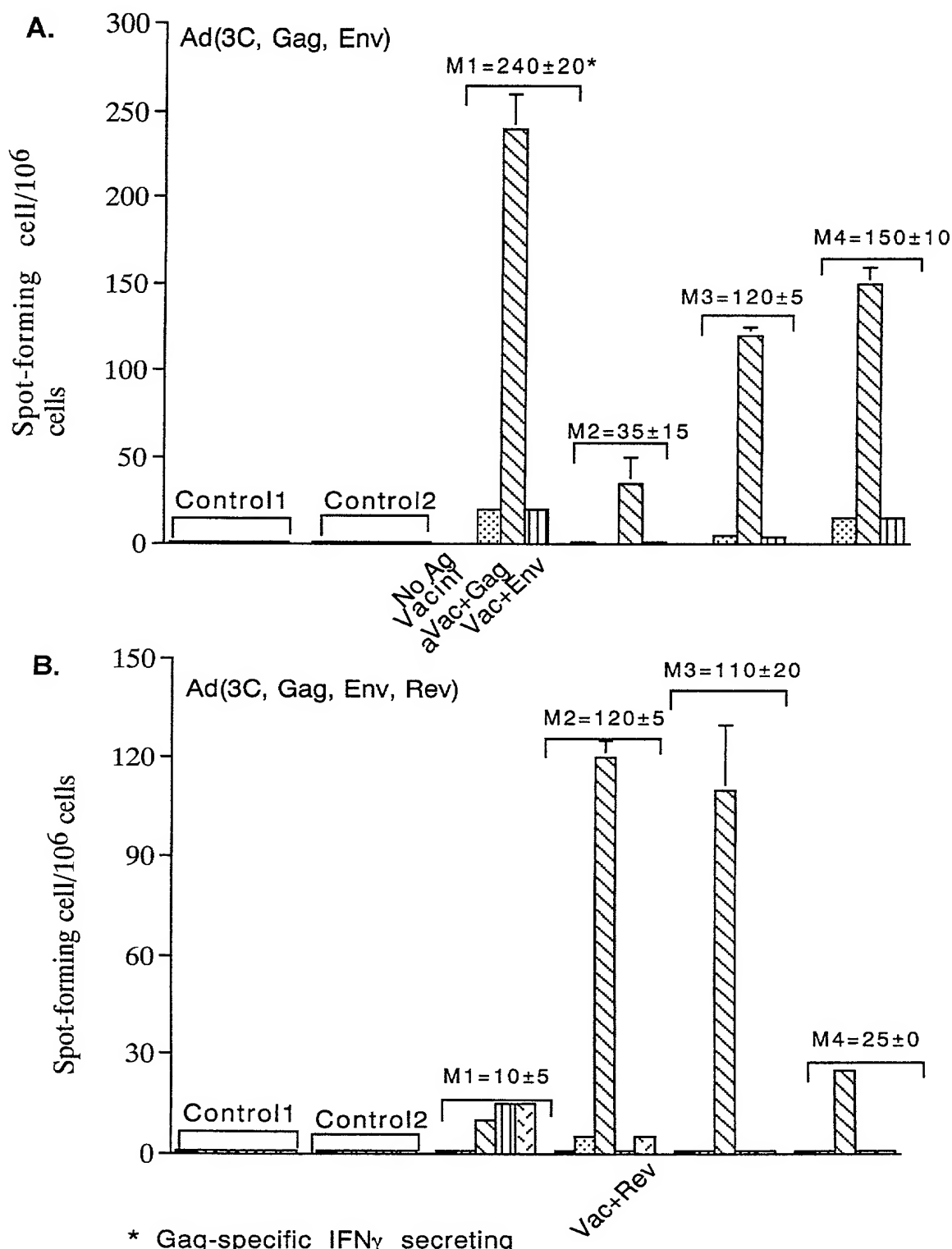


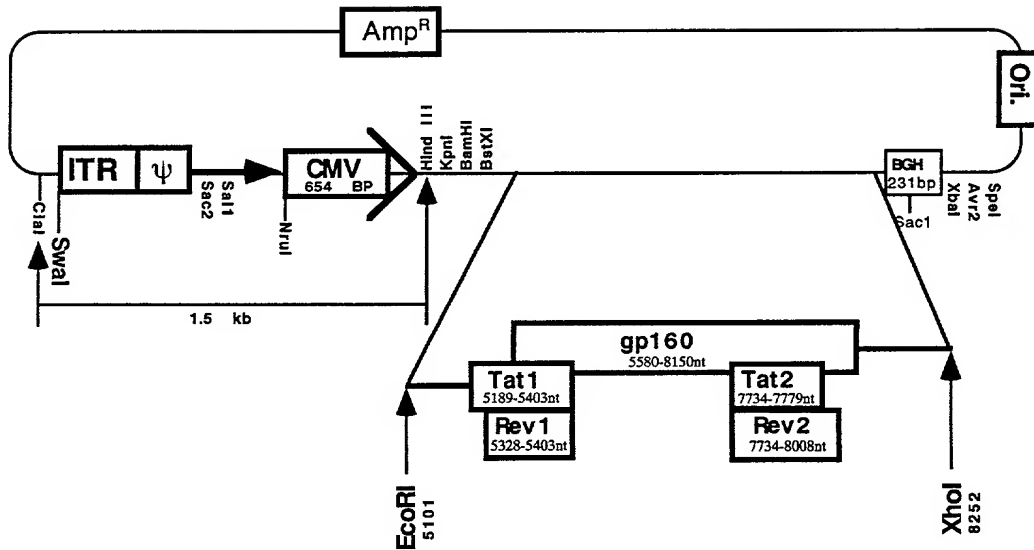
FIGURE 15

L23: ELISPOT for IFN γ secretion: Serie1 spleen cells from mice at week W13/2 (post-prime/boost)



Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

A. pLAd-E.T.R



B. pRAd. ORF6-IL2

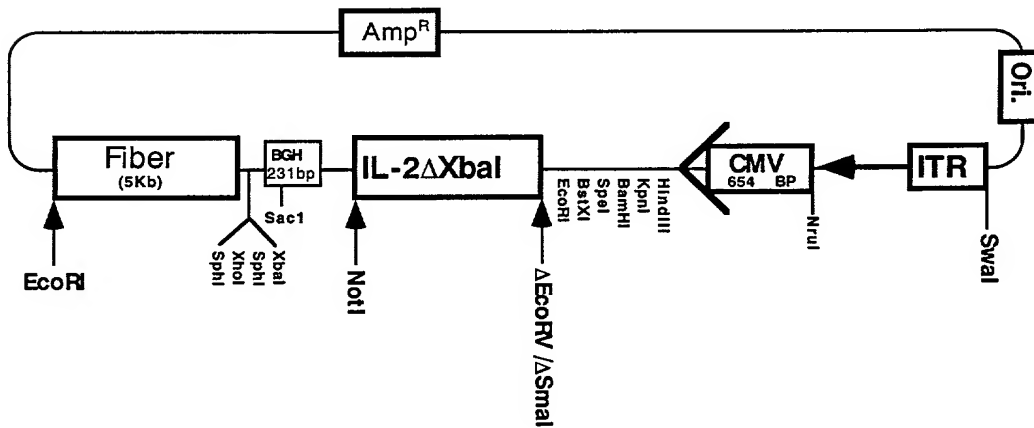


FIGURE 18

pRad.ORF6-E^mΔCAT⁹⁹.T.R-G

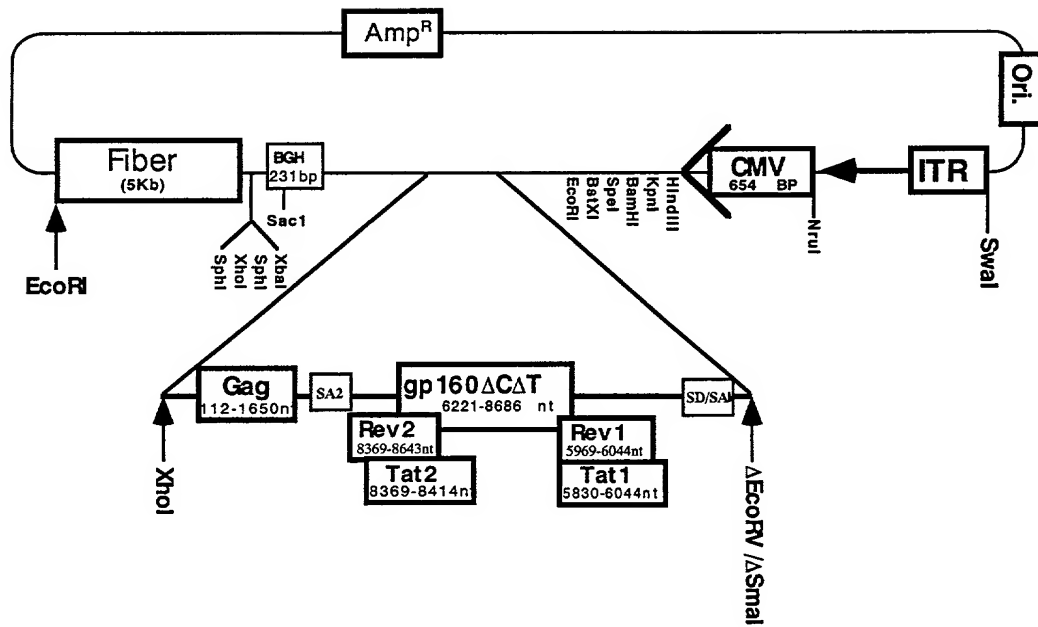
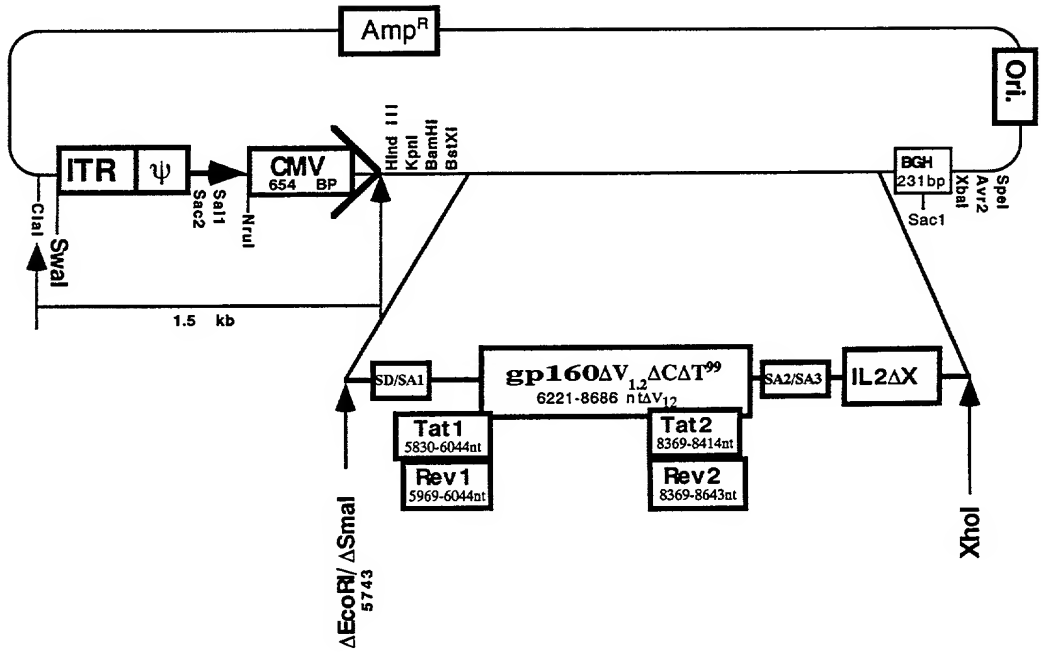
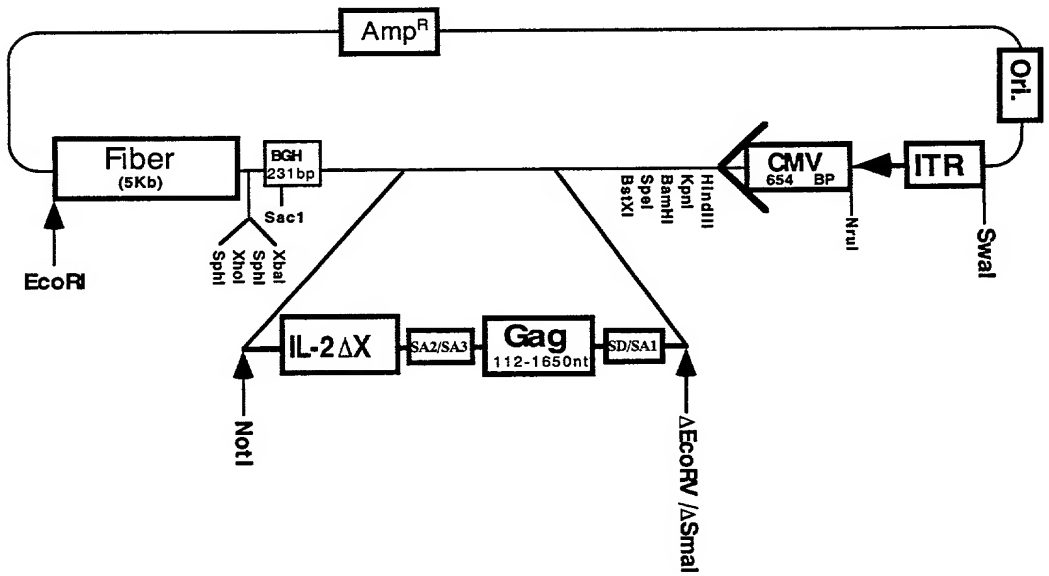


FIGURE 19

A. pLAd-E^m $\Delta V_{1,2}$ Δ CAT.T.R-IL2



B. pRAd. ORF6-G.IL2



Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

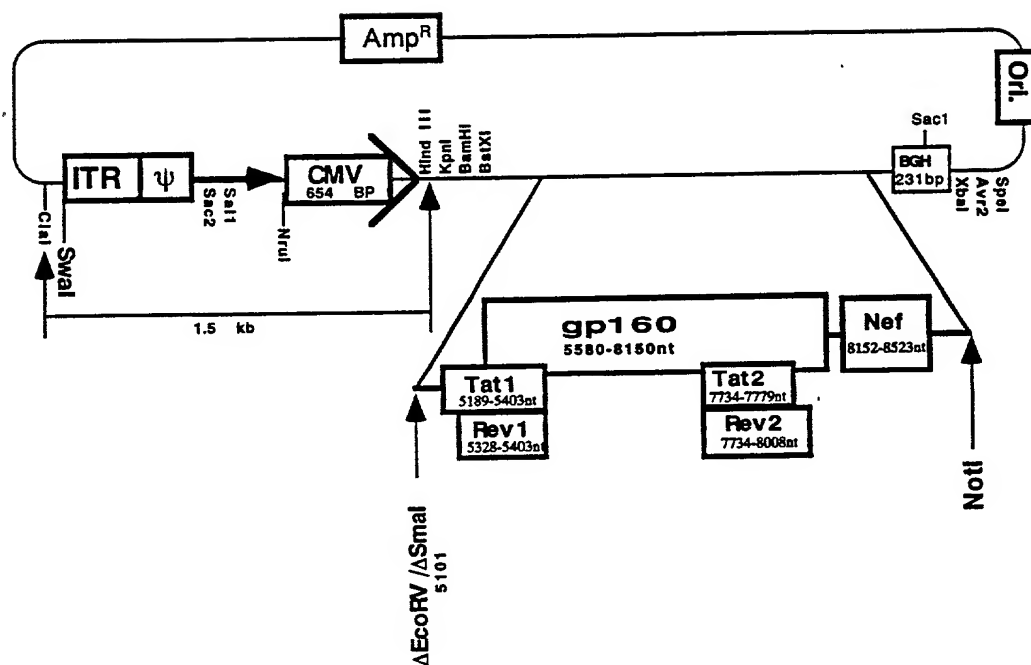


FIGURE 21

pLAd-E^mΔC.N

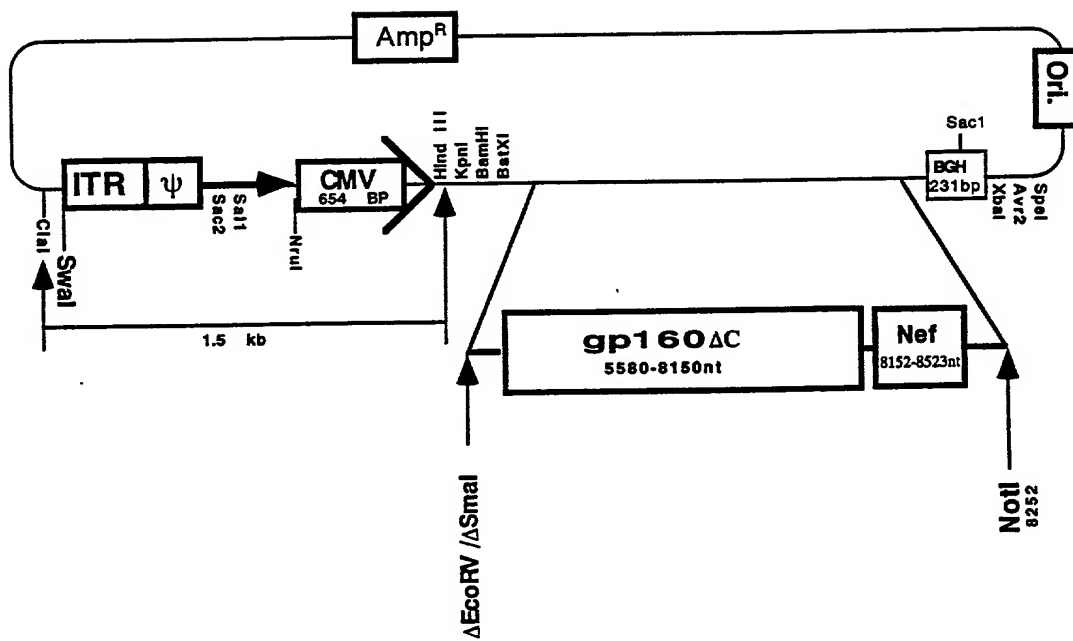


FIGURE 22

pLAd-E^{wt}ΔCAT³⁰⁰.T

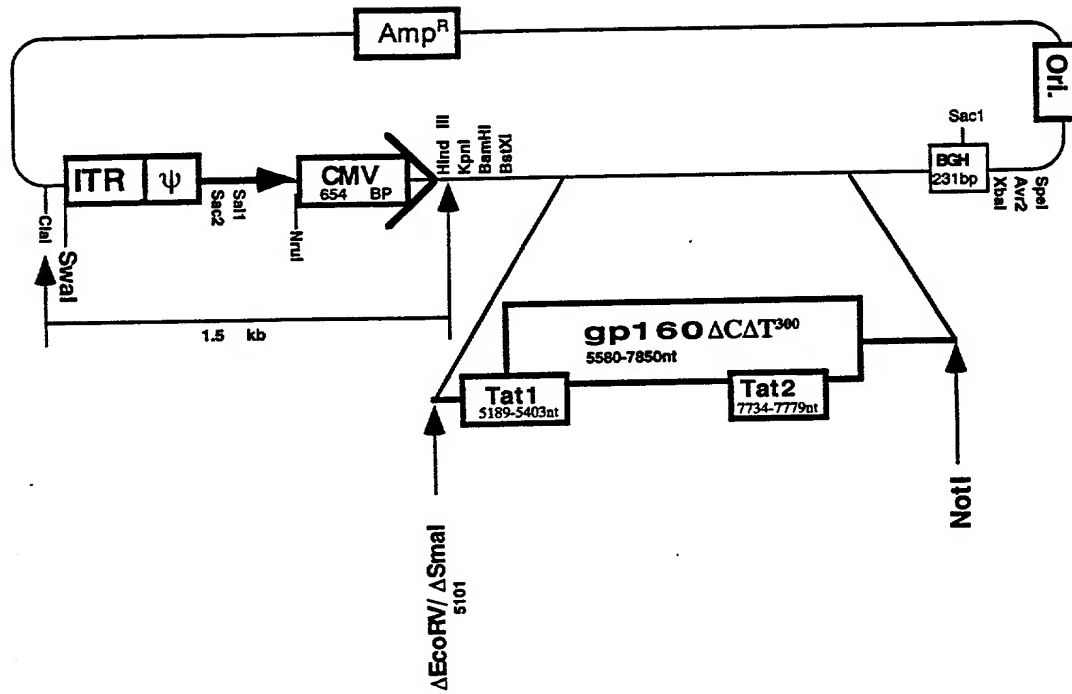
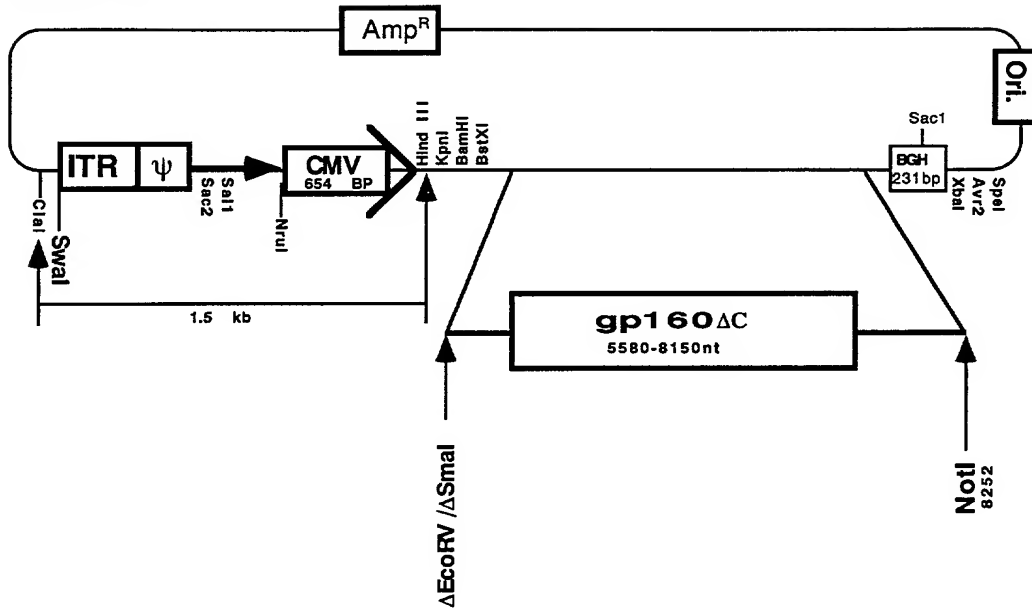


FIGURE 23

A. pLAd-E^mΔC



B. pRAd. ORF6-E^mΔC

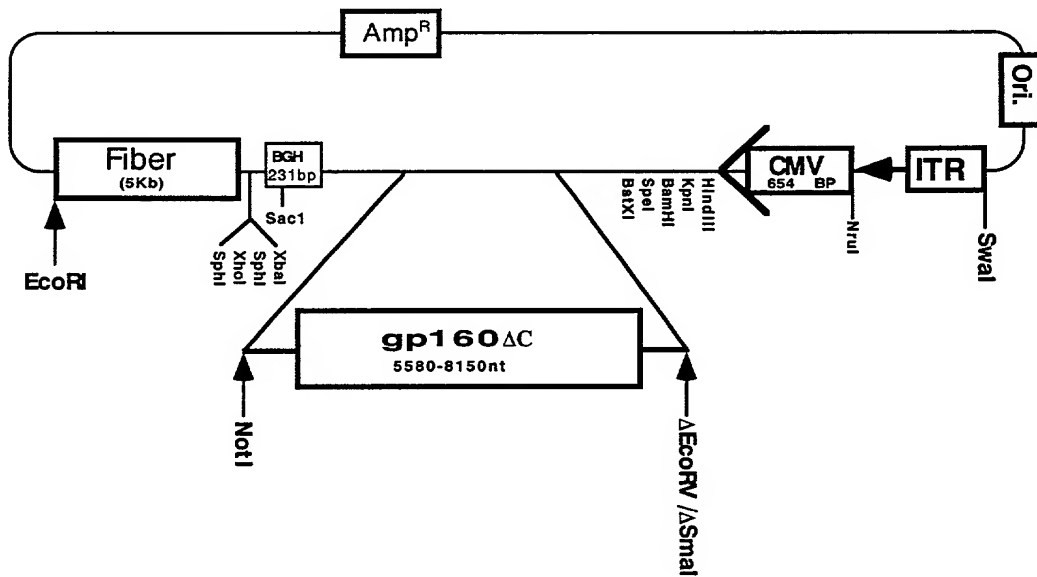
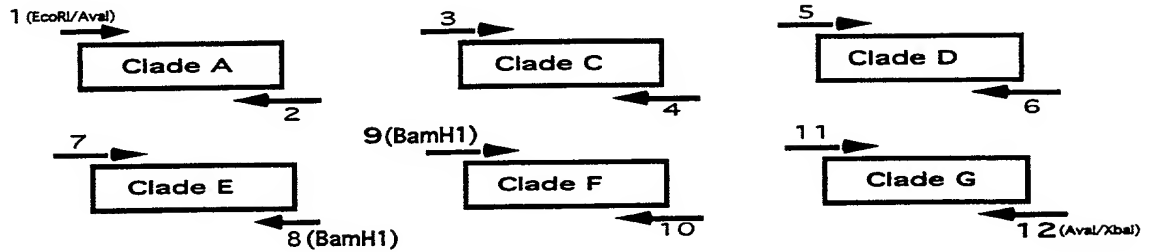
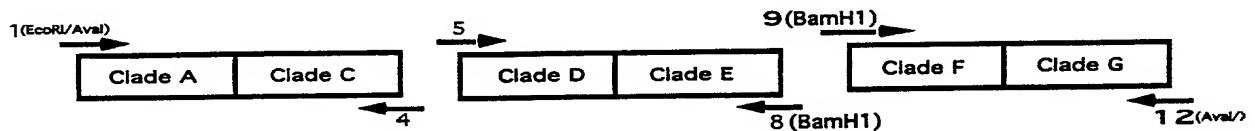


FIGURE 24

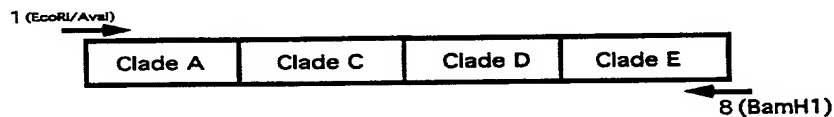
Step 1. Amplification of each individual clone A-G



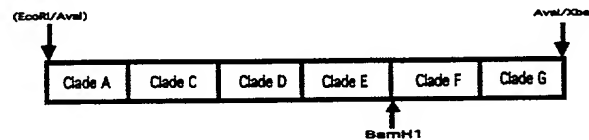
Step 2. Amplification of every two Clones AC, DE, FG



Step 3. Amplification of Clones ACDE



Step 4. Cloning the multi-clones into pSP73 vector



Step 5. Generating of a duplicated multi-clones

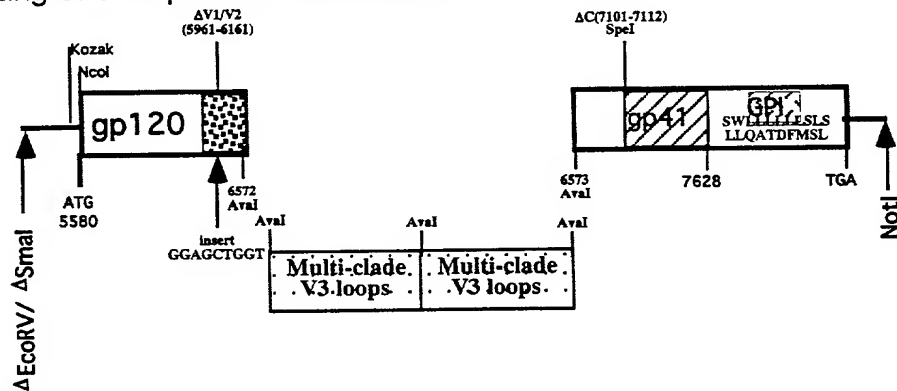


FIGURE 25

pLAd-E^{III}.V3

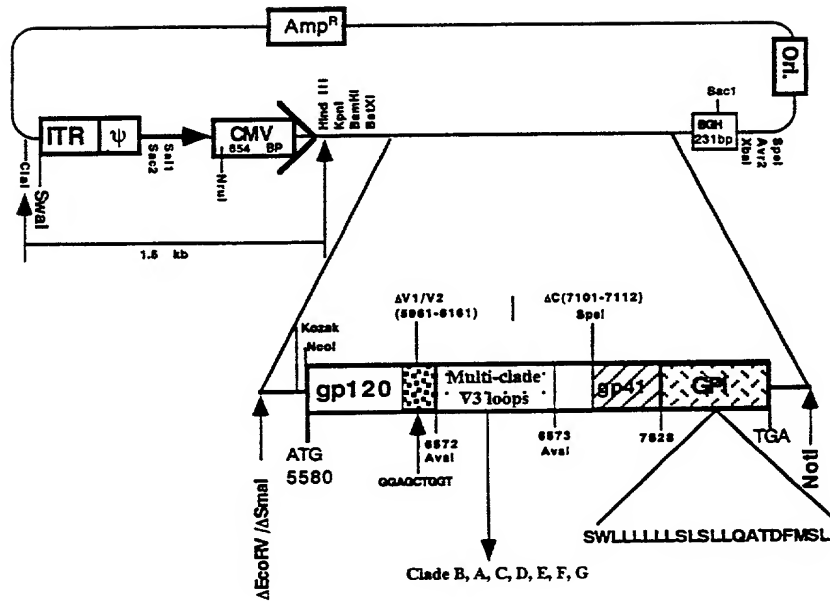
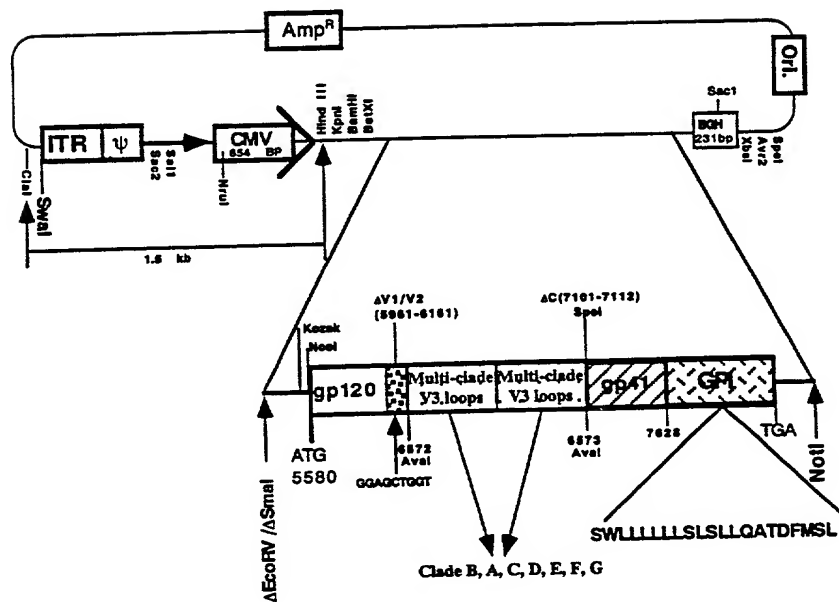


FIGURE 26



[illegible]

C. pRad. ORF6-p17/ 24 MB

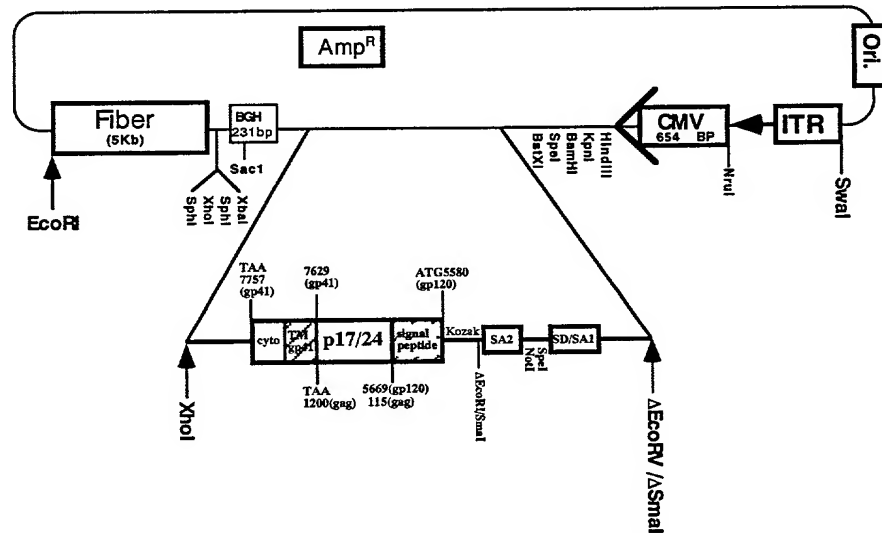
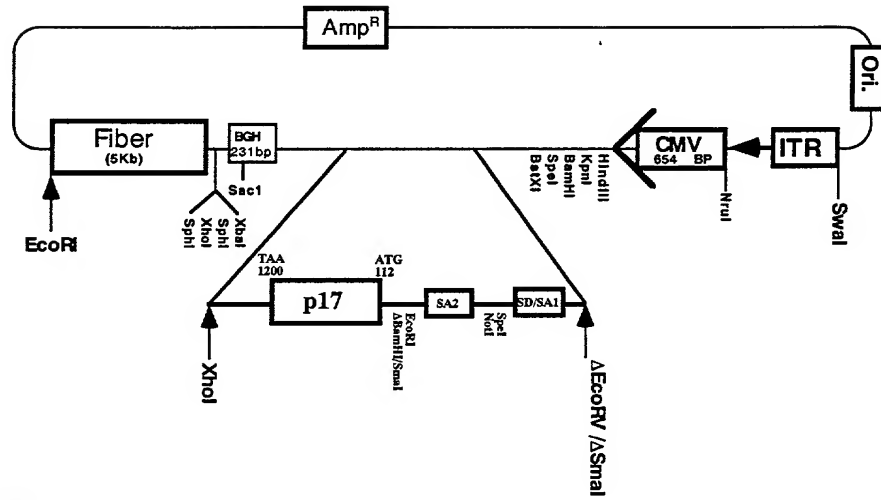
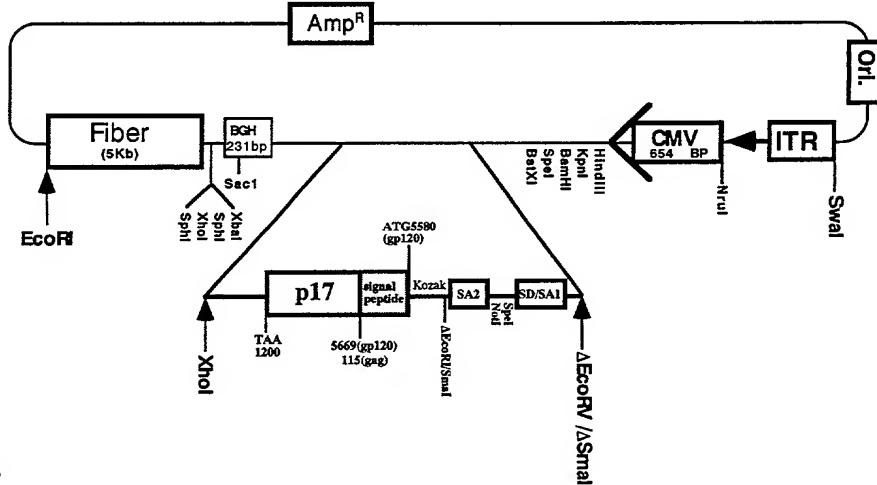


FIGURE 28

A. pRA_d.ORF6-p17



B. pRA_d.ORF6-p17 sec



C. pRA_d.ORF6-p17MB

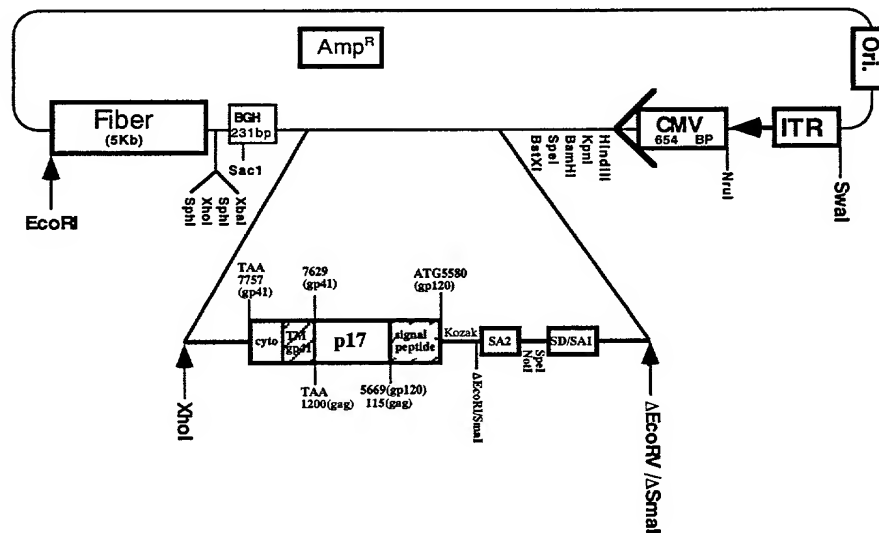
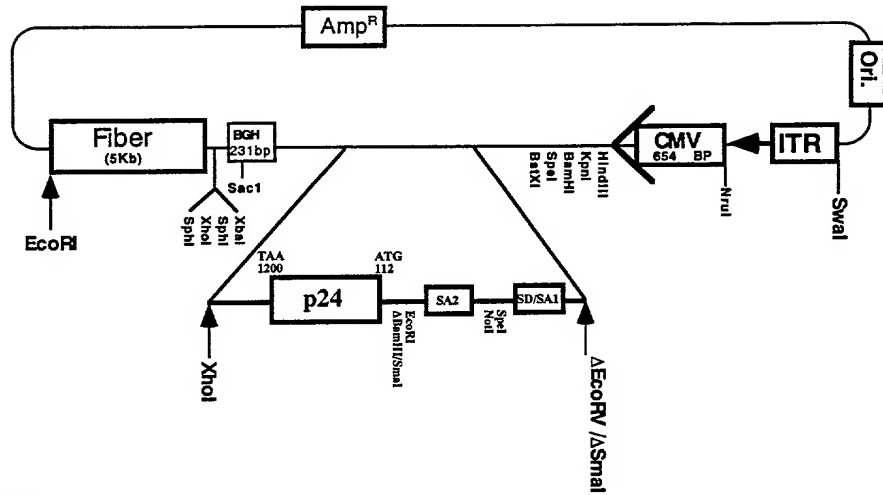
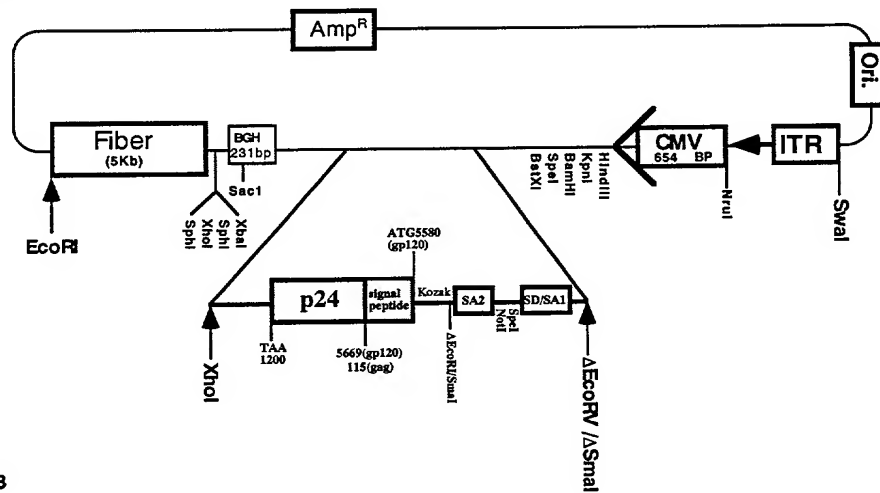


FIGURE 29

A. pRad.ORF6-p24



B. pRad.ORF6-p24sec



C. pRad.ORF6-p24 MB

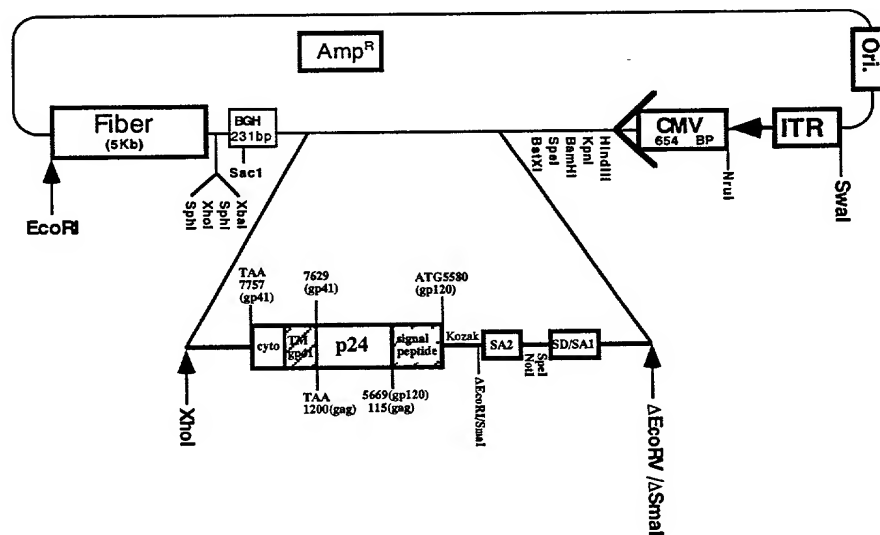


FIGURE 30 Adenoviral construct of Ad-E^m.V3^m/p17/24MB

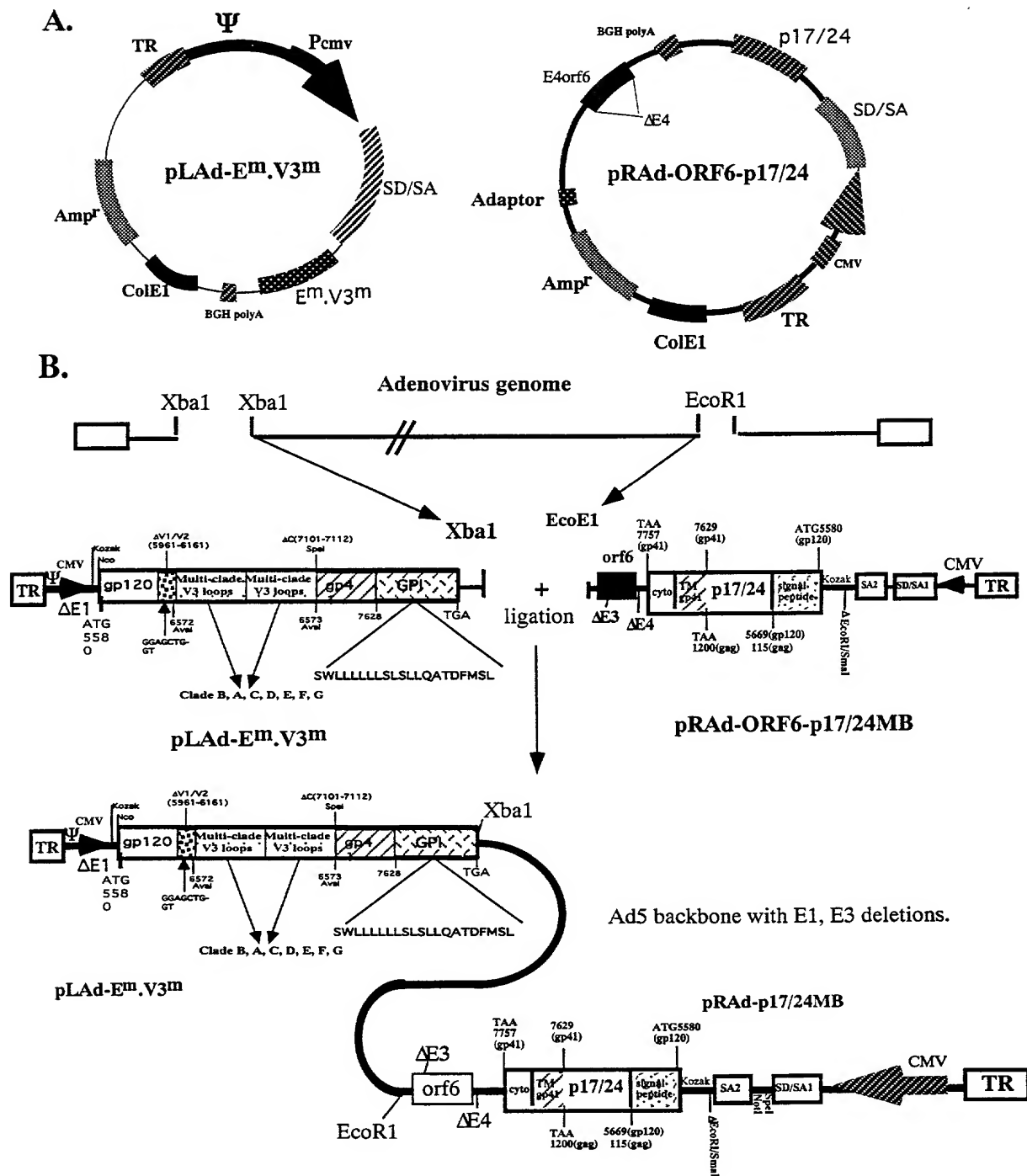


FIGURE 31 Adenoviral construct of Ad-Em.V3m/p17MB

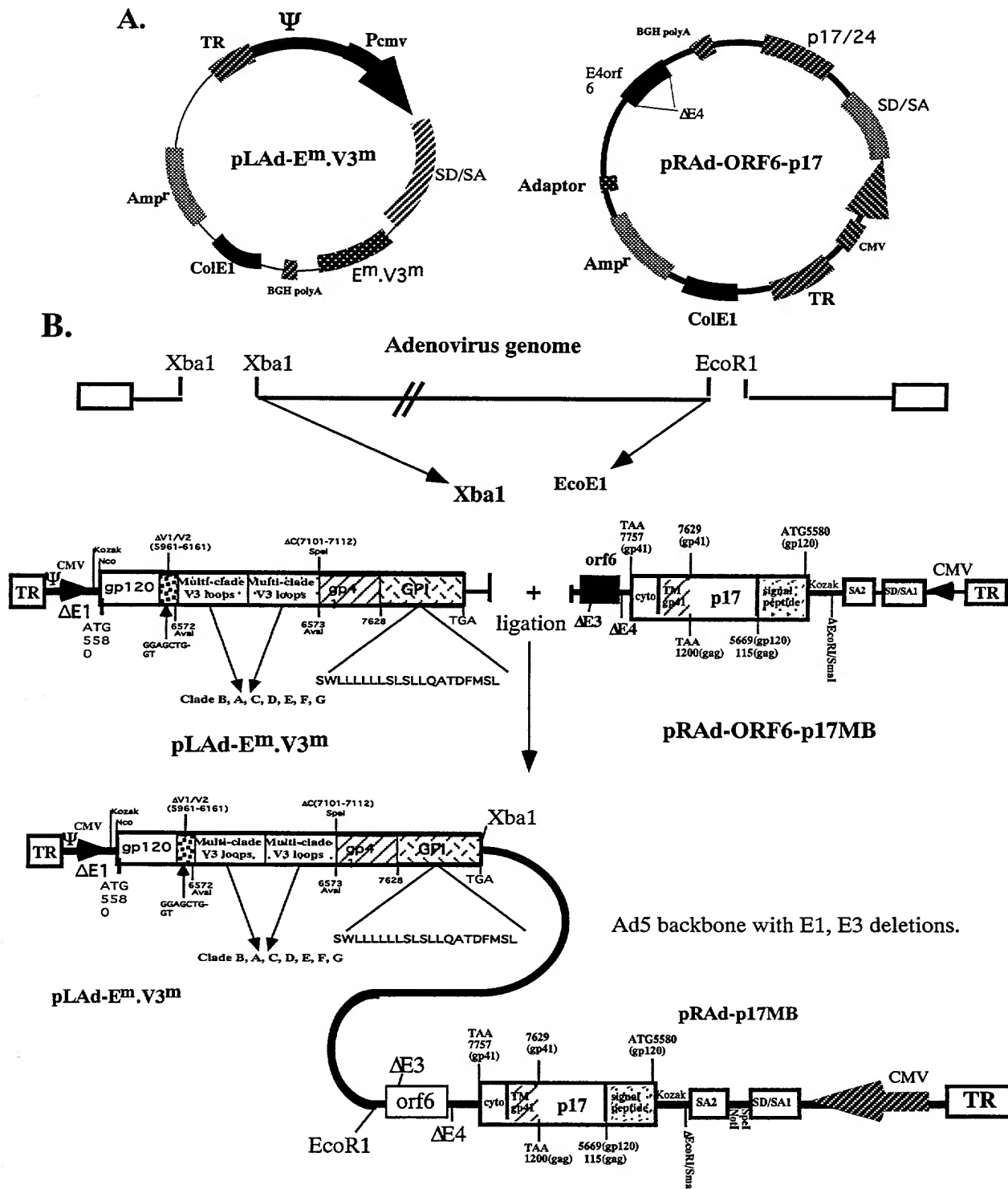


FIGURE 32 Adenoviral construct of Ad-E^m.V3^m/p24MB

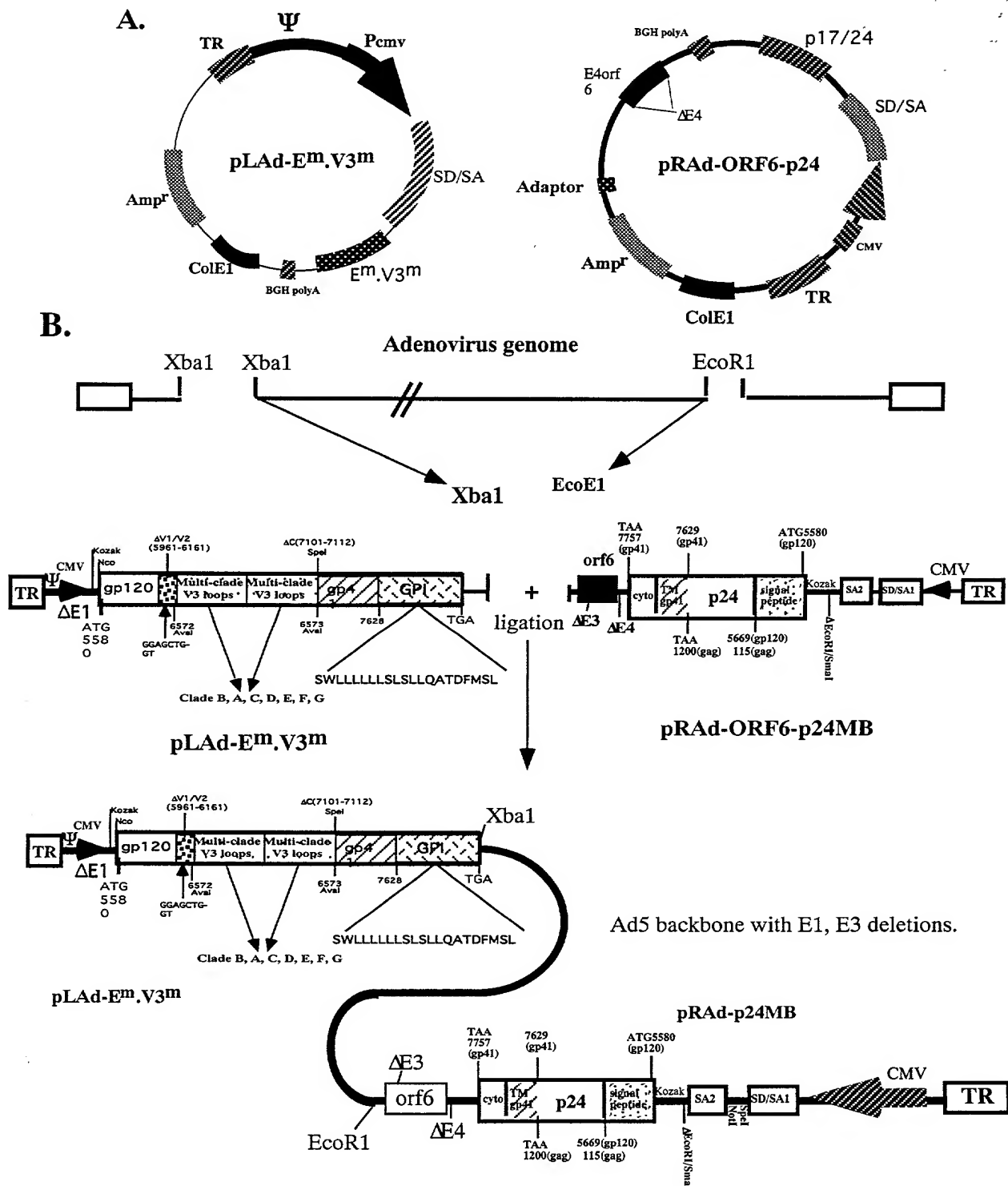
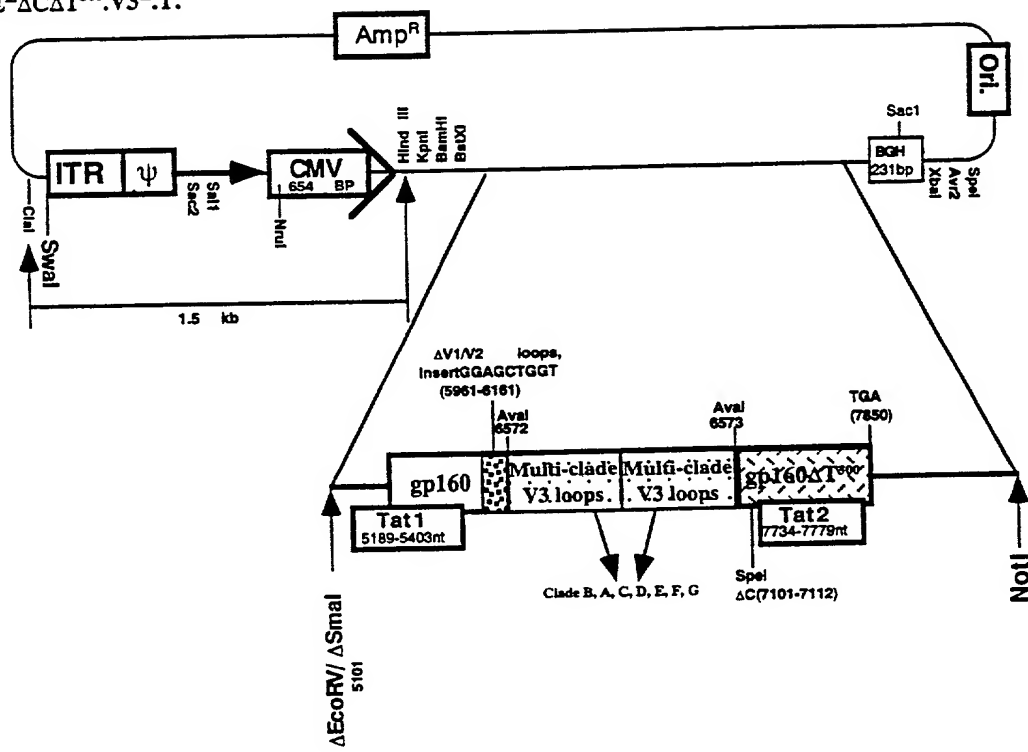
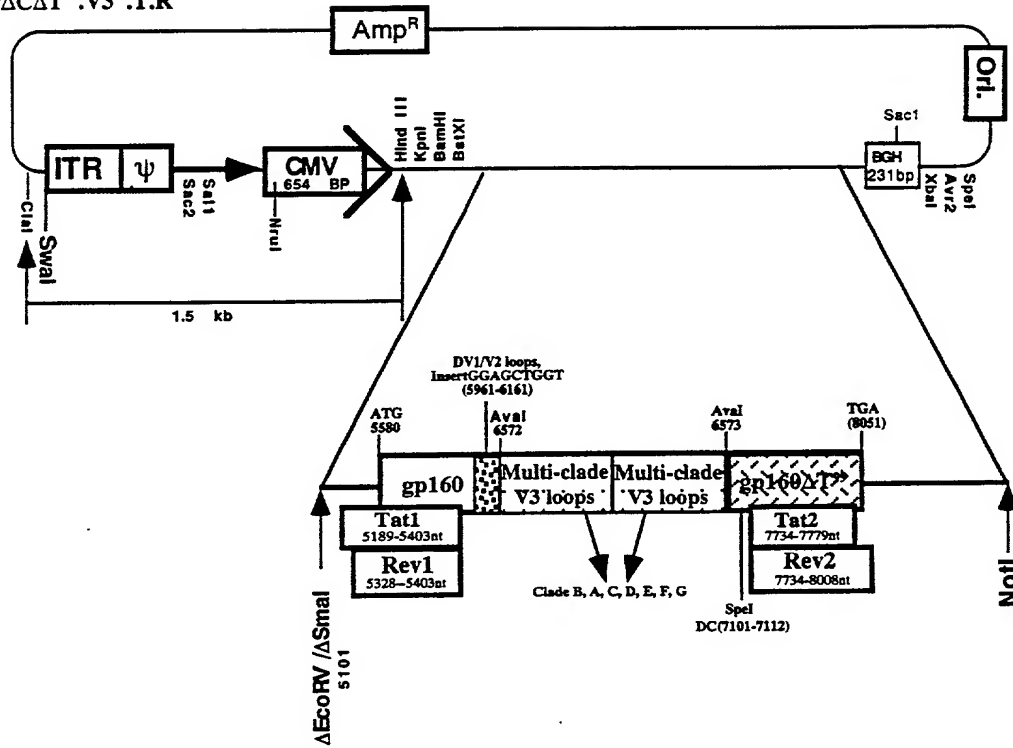


FIGURE 33

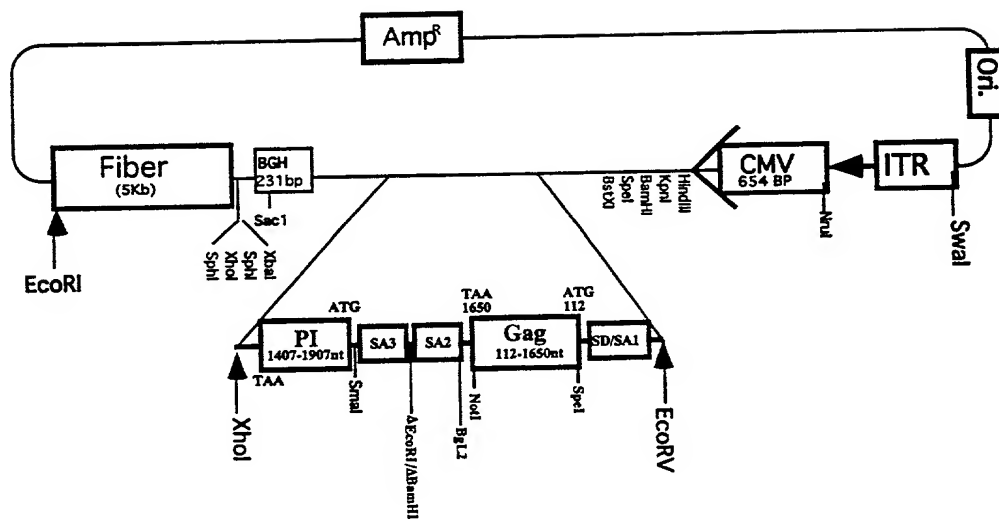
pLAd-E^ΔCAΔT³⁰⁰.V3^Δ.T.



[illegible]

pRAAd. ORF6-G.PI

FIGURE 35



pRAd.ORF6-G-PI

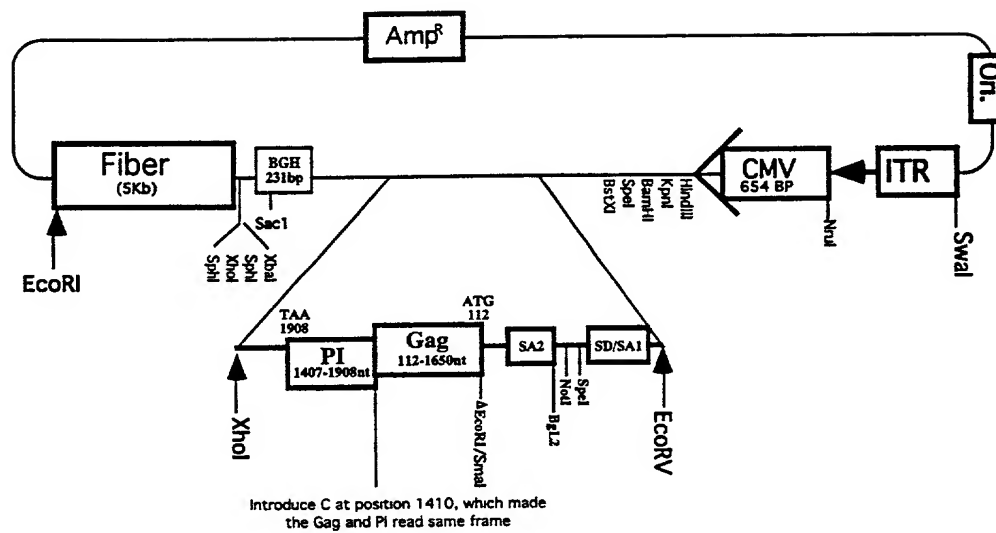


FIGURE 37

SD/SA1.2.3 vector

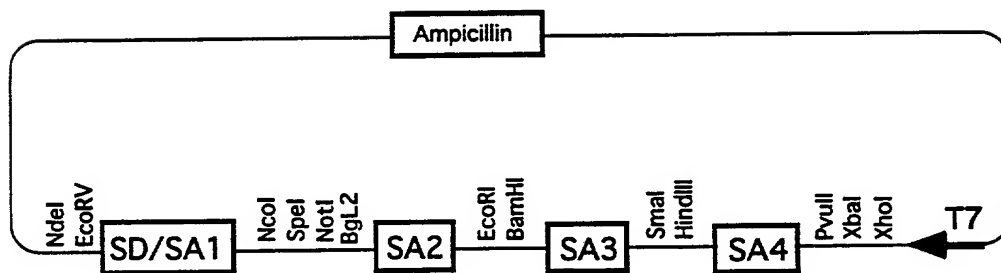


FIGURE 38

DNA Sequence of Env/Tat/Rev from BH10 clone [SEQ ID NO: 14]:

Gaatttctgcaacaactgctggtttatccattttcagaattgggtgtcgacat

EcoRI

agcagaataggcgttactcgacagaggagagcaagaaatggagccagtagatcctagactagagccctgga
agcatccaggaagtcagcctaaaactgcttgaccaattgctattgtaaaaagtgttgctttcattgccaa
gtttgtttcatacaaaaagccttaggcattctcctatggcaggaagaagcggagacagcgacgaagacctcc
tcaaggcagtcagactcatcaagtttctctatcaaagcagtaagtagtacatgtaatgcaacctatacaaa
tagcaatagtagcatttagtagtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatat
aggaaaatattaagacaaaagaaaaatagacaggttaattgatagactaatagaaagagcagaagacagtg
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gtagtagcgggagaatgataatggagaaaggagagataaaaaactgctcttcaatatcagcacaagcata
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cgtatccagagaggaccagggagagcatttgttacaataggaaaaataggaaatatgagacaagcacattg
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gagatatgagggaacattggagaagtgaattatataaaatataaagttagtaaaaattgaaccattaggagta
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gctcctggggatttggggttgcctctggaaaactcatttgcaccactgctgtgccttgggaatgctagtgg
gtaataaatctctggaacagatttggaaataacatgacctggatggagtgggacagagaaattaacaattac
acaagcttaatacactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattgga
attagataaatgggcaagtttgtggaattggtttaacataacaaattggctgtggtatataaaattattca
taatgatagtaggaggttggtaggtttaagaatagtttttgcgtgactttctgtagtgaatagagttagg
cagggatattcaccattatcgtttcagacccacctcccaatcccagggggacccgacagggcccgaaggaat
agaagaagaaggtggagagagagacagagacagatccattcgattagtgaaacggatccttagcattatct
gggacgatctgcccagcctgtgcctcttcagctaccaccgcttgagagacttactcttgattgtaacgagg
attgtggaactctgggacgcagggggtgggaagccctcaaataattggtggaatctcctacagttatggag
tcaggagctaaagaatagtgctgttagcttgcataatgccacagctatagcagtagctgaggggacagata
gggttatagaagtagtacaaggagcttatagagctattcgccacatacctagaagaataagacagggccttg
gaaaggattttgctataagatgggtggcaagtggtaaaaaagtagtggttggtggatggcctgctgtaagg
aaagaatgagacgagctgagccagcagcagatgggggtgggagcagcatctcgag

XhoI

FIGURE 39

DNA Sequence of IL-2ΔX [SEQ ID NO: 15]:

Tcactctctttaatcactactcacagtaacctcaactcctgccacaatgta
caggatgcaactcctgtcttgcatcactaagtcttgcaactgtcacaaa
cagtgcacctacttcaagttctacaaagaaaacacagctacaactggagca
tttactgctggatttacagatgattttgaatggaattaataattacaagaa
tcccaaactcaccaggatgctcacatttaagttttacatgccaagaaggc
cacagaactgaaacatcttcagtgctcttgaagaagaactcaaacctctgga

ΔXbaI (cta → ctt)

ggaagtgcataaatttagctcaaagcaaaaactttcacttaagacccaggga
cttaatcagcaatatcaacgtaatagttctggaactaaagggatctgaaac
aacattcatgtgtgaatatgctgatgagacagcaaccattgtagaatttct
gaacagatggattaccttttgtcaaagcatcatctcaacactaacttga

FIGURE 40

DNA Sequence of Env^mΔCΔT³⁰⁰ (HIV strain BH10) [SEQ ID NO: 16]:

Gaattcgccaccatgggagtggaaggagaaatatcagcacttgtggagatg

EcoRI Kozak NcoI

ggggtggagatggggcaccatgctccttgggatgttgatgatctgtagtgtacagaaaaa
ttgtgggtcacagtctattatgggtacctgtgtggaaggaagcaaccaccactctat
gtgcatcagatgctaaagcatatgatacagaggtacataatgtttgggccacacatgcctg
tgtaccacagaccccaaccacagaagtagtattggtaaattgtgacagaaaattttaac
atgtggaaaaatgacatggtagaacagatgcatgaggatataatcagtttatgggatcaaa
gcctaaagccatgtgtaaaattaacccactctgtgttagtttaaagtgcactgatttgaa
gaatgataactaataccaatagtagtagcgggagaatgataatggagaaaggagagataaaa
aactgctctttcaatatcagcacaagcataagaggtaagggtgcagaaagaatatgcatttt
tttataaacttgatataataccaatagataatgatactaccagctatacgttgacaagttg
taacacctcagtcattacacaggcctgtccaaagggtatcctttgagccaattcccatat
tattgtgccccggctggttttgcgattctaaaatgtaataataagacgttcaatggaacag
gacctgtacaaatgtcagcacagtagcaatgtacacatggaattaggccagtagtatcaac
tcaactgctgttaaattggcagctctggcagaagaagaggtagtaattagatctgccaatttc
acagacaatgctaaaaccataatagtagcagctgaaccaatctgtagaaattaattgtacaa
gacccaacaacaatacaagaaaaagtatccgtatccagagaggaccaggagagcatttgt
tacaataggaaaaataggaaatatgagacaagcacattgtaacattagtagagcaaaatgg
aataacacttttaaacagatagatagcaaatgaagaacaatttggaataataaaacaa
taatctttaagcagtcctcaggaggggacccagaaattgtaacgcacagttttaattgtgg
aggggaatttttctactgtaattcaacacaactgtttaatagtacttggtttaatagtact
tggagtactaaagggtcaaataaactgaaggaagtgcacaaatcacctcccatgcagaa
taaaacaaattataaacatgtggcaggaagtaggaaaagcaatgtatgcccctcccatcag
tggacaaattagatgttcatcaaataattacagggtgctattaacaagagatggtggtaat
agcaacaatgagtcagagatcttcagacctggaggaggagatatgaggggacaattggagaa
gtgaattatataaatataaagttagtaaaaattgaaccattaggagtagcaccaccaaggc
aaagagaagagtggtgcagACTAGTgcagtggaataggagctt

ΔCleavage site (**agagaaaaaga**) → SpeI

tgttccttgggttcttgggagcagcaggaagcactatgggcgagcgtcaatgacgctgac
ggtacaggccagacaattattgtctggtatagtgacgcagcagacaatttgcctgagggt
attgaggcgcaacagcatctgttgcaactcacagtctggggcatcaagcagctccaggcaa
gaatcctggctgtggaaagatacctaaggatcaacagctcctggggatttggggttgctc
tggaaaactcatttgcaccactgctgtgccttgggaatgctagtggagtaataaatctctg
gaacagatttgaataacatgacctggatggagtgggacagagaaattaacaattacacaa
gcttaatacactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaatt
attggaattagataaatgggcaagtttgtggaattgggttaacataacaaattggctgtg
tatataaaattattcataatgatagtaggaggttggttaggtttaagaatagtttttgctg
tactttctgtagtgaatagagtttaggcagggatattcaccattatcgtttcagacccacct
cccaatcccagggggacccgacaggcccgaaggaatagaagaagaaggtggagagagagac
agagacagatccattcgattagtgaacggatccttagcacttatctggtaa

FIGURE 41A

DNA Sequence of Full length HIV-1 Gag [SEQ ID NO: 17]:

ggctagaaggagagaggatgggtgcgagagcgtcagtattaagcgggggag
aattagatcgatgggaaaaaattcggttaaggccagggggaaagaaaaaat
ataaattaaaacatatagtatgggcaagcaggagctagaacgactacaac
catcccttcagacaggatcagaagaacttagatcattatataatacagtag
caaccctctattgtgtgcatcaaaggatagagataaaagacaccaaggaag
ctttagacaagatagaggaagagcaaaacaaaagtaagaaaaaagcacagc
aagcagcagctgacacaggacacagcagtcaggtcagccaaaattacccta
tagtgcagaacatccaggggcaaattggtacatcaggccatatcacctagaa
ctttaaatgcatgggtaaaagtagtagaagagaaggctttcagcccagaag
taatacccatgttttcagcattatcagaaggagccaccccacaagatttaa
acaccatgctaaacacagtggggggacatcaagcagccatgcaaatgttaa
aagagaccatcaatgaggaagctgcagaatgggatagagtacatccagtgc
atgcagggcctattgcaccaggccagatgagagaaccaaggggaagtgaca
tagcaggaactactagtacccttcaggaacaaataggatggatgacaaata
atccacctatcccagtaggagaaattttataaaaagatggataatcctgggat
taaataaaaatagtaagaatgtatagccctaccagcatttctggacataagac
aaggaccaaagaaccttttagagactatgtagaccggttctataaaactc
taagagccgagcaagcttcacaggaggtaaaaaattggatgacagaaacct
tgttgggtccaaaatgcgaaccagattgttaagactattttaaaagcattgg
gaccagcggctacactagaagaaatgatgacagcatgtcagggagtaggag
gacccggccataaggcaagagttttggctgaagcaatgagccaagtaacaa
atacagctaccataatgatgcagagaggcaatttttaggaaccaaaagaaaga
tggttaagtgtttcaattgtggcaaagaagggcacacagccagaaattgca
gggcccctaggaaaaagggtgttggaatgtggaaaggaaggacaccaa
tgaaagattgtactgagagacaggctaatttttttagggaagatctggcctt
cctacaagggaaggccagggaattttcttcagagcagaccagagccaacag
ccccaccattttcttcagagcagaccagagccaacagccccaccagaagaga
gcttcaggctctggggtagagacaacaactccccctcagaagcaggagccga
tagacaaggaactgtatcctttaacttcctcagatcactctttggcaacg
accctcgtcacataaa

FIGURE 41B

Amino Acid Sequence of HIV-1 (Strain BH10) Gag [SEQ ID NO: 18]:

M G A R A S V L S G G E L S K G G E L D R H W E K
I R S R R P G V K K Q P K K Q P S Y L Q T G H I S V E W
L R S L R L Y N T L Q A T S L C V H Q Q R N I K
E I K K D T K Q A D K I E E S S Q Q V A F
S Q S N Y P I L V N Q A W I V K G V M E V H K Q A P Q M
S P E R T I P M L N E F T V A G L S E G A A T P Q M V
D L K E T I A N E E A A G E W D R V H Q P V I
H A G T P S A P L E W P R G I M T N N I P
A G I P T V S E L I Q Y T D W K V T A G T L G N N K
P I V R M Y S P V D W K V T A G T L G N N K
I E P F R D Y N I L G V T A G T L G N N K
E A S Q D V K N I L G V T A G T L G N N K
N E P D C K T C Q R C M Y P S L *
L G A N F T E I P E P E N
G G H K E I P E P E N
G K K E I P E P E N
P P E P E P E P E P E
E N D P P S S S Q Q Y P

FIGURE 42

DNA Sequence of E^mΔCΔT⁹⁹.T.R (HIV strain pNL4-3) [SEQ ID NO: 19]:

Gaattctgcaacaactgctgtttatccatttcagaattgggtgtcgacatag

EcoRI

cagaataggcgttactcgacagaggagagcaagaaatggagccagtagatcctagactagagccctggaagca
tccaggaagtgcgcctaaaactgcttgtaaccaattgctattgtaaaaagtgttgctttcattgccaagtttgt
ttcatgacaaaagccttaggcatctcctatggcaggaagaagcggagacagcgacgaagagctcatcagaaca
gtcagactcatcaagcttctctatcaaaagcagtaagttagtacatgtaatgcaacctataatagtagcaatagt
agcattagtagtagcaataataatagcaatagttgtgtgtggtccatagtaatcatagaatataggaaaatatta
agacaaagaaaaatagacaggttaattgatagactaatagaaagagcagaagacagtggcaatgagagtgaag
gagaagtatcagcacttgtggagatgggggtggaaatggggcaccatgctccttgggatattgatgatctgta
gtgctacagaaaaattgtgggtcacagcttattatgggtacctgtgtggaaggaagcaaccaccactctatt
ttgtgcatcagatgttaaagcatatgatacagaggtacataatgtttgggccacacatgctgtgtaccaca
gaccccaaccacagaagtagtattggtaaattgtgacagaaaaattttaacatgtggaaaaatgacatggtag
aacagatgcatgaggatataatcagtttatgggatcaaaagcctaagccatgtgtaaaaattaacccactctg
tgtagtttaaaagtgcactgatttgaagaatgataactaataccaatagtagtagcgggagaatgataatggag
aaaggagagataaaaaaactgctctttcaatatcagcacaagcataagagataaggtgcagaaaagaatatgcat
tcttttataaaacttgatatagtagtaccatagataataacca
gctatagggttgataagttgtaacacctcagtcattacacaggcctgtccaaaggatcctttgagccaattcc
catacattattgtgccccggctgggttttgcgattctaaaatgtaataataagacgttcaatggaacaggacca
tgtacaaatgtcagcacagtagtaaatgtacacatggaatcaggccagtagtatcaactcaactgctgttaaatg
gcagcttagcagaagaagatgtagtaattagatctgccaatttcacagacaatgctaaaaccataatagtaca
gctgaacacatctgtagaaattaattgtacaagacccaacaacaatacaagaaaaagtatccgtatccagagg
ggaccaggagagcatttgttacaataggaaaaataggaaatatgagacaaagcattgttaacattagtagag
caaaatggaatgccactttaaaacagatagctagcaaatgaagagaacaatttggaaataataaaaacaataat
ctttaagcaatcctcaggaggggaccagaaaattgtaacgcacagttttaattgtggaggggaaattttctac
tgtaattcaacacaactgtttaatagtagtacttggtttaatagtagtacttgagtagtgaagggtcaaataacactg
aagggaagtgcacacatcacactcccatgcagaataaaaacaatttataaacatgtggcaggaagtaggaaaagc
aatgtatgccctcccatcagtggaacaaattagatgttcatcaaatattactgggctgctattacaagagat
gggtgtaataacaacaatgggtccgagatcttcagacctggaggaggcgatatgagggacaattggagaagtg
aattatataaatataaagtagtaaaaattgaaccattaggagtagcaccaccaaggcaagagaagagtggg
gcagACTAGTgcagtggaataggagccttgttccttg

ΔCleavage site (agagaaaaaaga) → SpeI

ggttcttgggagcagcaggaagcactatggggtgcacgtcaatgacgctgacggtacaggccagacaattatt
gtctgatatagtgagcagcagaacaatttgcaggggctattgaggcgcaacagcatctgttgcaactcaca
gtctggggcatcaaacagctccaggcaagaatcctggctgtggaaagatacctaaaggatcaacagctcctgg
ggatttggggtgtctctggaactcatttgcaccactgctgtgccttggaaatgctagttggagtaataaatc
tctggaacagatttggaaataacatgacctggatggagtggaagagagaaatttaacaattacacaagcttaata
cactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattggaattagataaatggg
caagtttgtggaattgggttaacataacaaattggctgtggtatataaaattattcataatgatagtaggagg
cttggttaggtttaaagaatagtttttgcgtgactttctatagtgaaatagagtttaggcagggatattcaccatta
tcgtttcagaccacctcccaatcccgaggggacccgacaggcccgaaggaaatagaagaagaaggtggagaga
gagacagagacagatccattcgattagtgaaacggatccttagcacttatctgggacgatctgcggagcctgtg
cctcttcagctaccacgcttgagagacttactcttgattgtaaacgaggattgtggaacttctgggacgcagg
gggtgggaagccctcaaatattgggtggaatctcctacagtattggagtcaggaaactaaagaatagtgctgta
acttgctcaatgccacagccatagcagtagctgagtaa

FIGURE 43

DNA Sequence of E^mΔV₁₂ΔCAT⁹⁹.T.R (Strain pNL4-3) [SEQ ID NO: 20]:

Gaattctgcaacaactgctgtttatccatttcagaattgggtgtcgacatag

EcoRI

Cagaataggcggttactcgacagaggagagcaagaaatggagccagtagatcctagactagagccctggaagca
tccaggaagt cagcctaaaactgctgtaccaattgctattgtaaaaagtgttgctttcattgccaagttgt
ttcatgacaaaagccttaggcattctcctatggcaggaagaagcggagacagcgacgaagagctcatcagaaca
gtcagactcatcaagcttctctatcaaagcagtaagtagtacatgtaatgcaacctataatagtagcaatagt
agcattagtagtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatataggaaaatatta
agacaaagaaaaatagacaggttaattgatagactaatagaaagagcagaagacagtggaatgagagtggaag
gagaagtatcagcacttgtggagatgggggtggaatggggcaccatgctccttgggatattgatgatctgta
gtgctacagaaaaattgtgggtcagagtctattatggggtagctgtgtggaaggaagcaaccaccactctatt
ttgtgcatcagatgctaaagcatatgatacagaggtacataatgtttgggccacacatgctgtgtaccacaca
gaccccaaccacagaagtagtatttggtaaatgtgacagaaaaattttaacatgtggaaaaatgacatggtag
aacagatgcatgaggatataatcagtttatgggatcaaagcctaaagccatgtgtaaaaattaaccccactctg
tggt ΔV1 and V2 loops

Agttgtaacacctcagtcattacacagggcctgtccaaaggtatcctttgagccaattcccatacattattgtg
ccccggctggttttgcgattctaaaaatgtaataataagacggttcaatggaacaggaccatgtacaaatgtcag
cacagtacaatgtacacatggaatcaggccagtagtatcaactcaactgctgttaaatggcagctctagcagaa
gaagatgtagtaattagatctgccaatttcacagacaatgctaaaaccataatagtagcagctgaacacatctg
tagaaattaattgtacaagacccaacaacaatacaagaaaaagtatccgtatccagaggggaccaggggagagc
atgtgttacaataggaataataggaatatgagacaagcacattgtaacattagtagagcaaaatggaatgcc
actttaaaacagatagctagcaaaattaagagaacaatttggaataataaaaacaataatctttaagcaatcct
caggaggggaccagaaattgtaacgcacagttttaattgtggaggggaatttttctactgttaattcaacaca
actgtttaatagtacttggtttaatagtacttggagtactgaaggggtcaaataaactgaaggaagtgcacaca
atcacactcccagcagaataaaaacaatttataaacatgtggcaggaagttaggaaaagcaatgtatgccctc
ccatcagtggaacaaattagatgttcatcaaatattactgggctgctattaacaagagatgggtggaataaaca
caatgggtccgagatcttcagacctggaggaggcgatagagggacaattggagaagtgaattatataaatat
aaagtagtaaaaattgaaccattaggagtagcaccaccaaaggcaagagaagagtggtgcagACTAGTgcag
tgggaataggagcctttgttccttgggttcttgggagca

ΔCleavage site (agagaaaaaaga) → SpeI

gcaggaagcactatgggctgcacgtcaatgacgctgacggtacagggcagacaattattgtctgatatagtg
agcagcagaacaatttgcagggctattgaggcgcaacagcatctgttgcaactcacagtctggggcatcaa
acagctccagggaagaatcctggctgtggaagatacctaaaggatcaacagctcctggggatttgggggtgc
tctggaaaactcatttgcaccactgctgtgccttggaaatgctagttggagtaataaatctctggaacagattt
ggaataacatgacctggatggagtgggacagagaaattaacaattacacaagcttaatacactccttaattga
agaatcgcaaaaccagcaagaaaaagaatgaacaagaattattggaattagataaatgggcaagtttgggaat
tggtttaacataacaaattggctgtggtatataaaattattcataatgatagtaggaggcttggtaggtttaa
gaatagtttttgcgtgactttctatagtgaatagagttaggcagggatattcaccattatcgtttcagacca
cctcccaatcccaggggacccgacagggcccgaaggaatagaagaagaaggtggagagagagacagagacaga
tccattcgattagtgaaaggatccttagcacttatctgggacgatctgcggagcctgtgcctcttcagctacc
accgcttgagagacttactcttgattgtaacgaggattgtggaacttctgggacgcaggggggtgggaagccct
caaatattgggtggaatctcctacagattggagtcaggaactaaagaatagtgtgttaacttgctcaatgcc
acagccatagcagtagctgagtaa

FIGURE 44

DNA Sequence of Env^mΔC.T.R.N (Strain BH10) [SEQ ID NO: 21]:

Gaattctgcaacaactgctgtttatccatcttcagaattgggtgtcgacat

EcoRI

agcagaataggcggttactcgacagaggagagcaagaatggagccagtagatcctagactagagccctgga
agcatccaggaagtgcagcctaaaactgcttgtagcaattgctattgtaaaaagtgttgccttcattgccaa
gtttgtttcataacaaaagccttaggcattctcctatggcaggaagaagcggagacagcgacgaagacctcc
tcaaggcagtcagactcatcaagtttctctatcaaagcagtaagtagtacatgtaatgcaacctatatacaa
tagcaatagtagcattagtagtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatat
aggaaaatattaagacaaaagaaaaatagacaggttaattgatagactaatagaaagagcagaagacagtg
caatgagagtggaaggagaaatatcagcactgtgtggagatgggggtggagatggggcaccatgctccttggg
atgttgatgatctgtagtgtacagaaaaattgtgggtcacagtcctattatggggtagctgtgtggaagga
agcaaccaccactctattttgtgcatcagatgctaaagcatatgatacagaggtacataatgtttgggcca
cacatgcctgtgtaccacagaccccaaccacagaagtagtattggtaaatgtgacagaaaaattttaac
atgtgaaaaatgacatggtagaacagatgcatgaggatataatcagtttatgggatcaaagcctaaagcc
atgtgtaaaattaacccactctgtgttagtttaaaagtgcactgatttgaagaatgataactaatccaata
gtagtacggggagaatgataatggagaaggagagataaaaaactgctctttcaatatcagcacaagcata
agaggttaaggtgcagaaagaatatgcattttttataaaacttgatataataccaatagataatgatactac
cagctatacgttgacaagttgtaacacctcagtcattacacaggcctgtccaaaggatcctttgagccaa
ttcccatacattattgtgccccggctggttttgcgattctaaaatgtaataataagacgttcaatggaaca
ggaccatgtacaaatgtcagcacagtagcaatgtacacatggaattaggccagtagtatcaactcaactgct
gttaaatggcagtcctggcagaagaagaggtagtaattagatctgccaatcttcacagacaatgctaaaacca
taatagtacagctgaaaccaatctgtagaatttaattgtacaagacccaacaacaatacaagaaaaagtatc
cgtatccagagaggaccagggagagcatttgttacaataggaaaaataggaaatagagacaagcacattg
taacattagtagagcaaatggaataacacttttaaacagatagatagcaaatgaaagagaacaatttgga
ataataaaacaataatctttaagcagtcctcaggaggggaccagaaattgtaacgcacagttttaattgt
ggaggggaatttttctactgttaattcaacacaaactgtttaatagtacttggtttaatagtacttggagta
taaaagggtcaataacactgaagggaagtgcacacatcacctcccatgcagaataaaacaaattataaaca
tgtggcaggaagtaggaaagcaatgtatgccccctcccatcagtggaacaaatagatgttcatcaaatatt
acagggtcgtctattaacaagagatggtggtaatgaacaatgagtcogagatcttcagacctggaggagg
agatatgagggacaattggagaagtgaattatataaatataaagtagtaaaaattgaaccattaggagtag
caccaccaaggcgaagagaagagtggtgcagACTAGTgcagtggaataggagctttgttccttgggttc
t

ΔCleave site (agagaaaaaga)→SpeI

tgggagcagcaggaagcactatgggagcagcgtcaatgacgctgacggtagcagccagacaattattgtct
ggtatagtgcagcagcagaacaatttgcctgagggctattgaggcgcaacagcatctgttgcaactcacagt
ctggggcatcaagcagctccaggcaagaatcctggctgtggaaagatacctaaaggatcaacagctcctgg
ggatttgggggttgccttggaactcatttgcaccactgctgtgccttggaatgctagtggagtaataaa
tctctgggaacagatttgggaataacatgacctggatggagtggaagagaaattaaacaattacacaagctt
aatacactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattggaattagata
aatgggcaagtttgcgaattggtttaacataacaaattggctgtggtatataaaattattcataatgata
gtaggaggttggtaggtttaagaatagtttttgcctgtactttctgtagtgaatagagttaggcagggata
ttcaccattatcgtttcagacccacctcccaatcccgaggggacccgacaggcccgaaaggaatagaagaag
aagggtggagagagagacagagacagatccattcgattagtgaacggatccttagcacttatctgggacgat
ctgaggagcctgtgcctcttcagctaccacgcttgagagacttactcttgattgtaacgaggattgtgga
acttctgggagcaggggggtgggaagccctcaaatattggtggaatctcctacagtagttgagtcaggagc
taaagaatagtgtctgttagcttgcctcaatgccacagctatagcagtagctgaggggacagatagggtata
gaagtagtacaaggagcttatagagctattcgccacatacctagaagaataagacagggcttggaaggat
tttgctataagatgggtggcaagtggtcaaaaagtagtggttggttggtggtggtggtggtggtggtggtg
agacgagctgagccagcagcagatgggggtgggagcagcatctcgagacctagaaaaacatggagcaatcac
aagtagcaacacagcagctaacaatgctgattgtgcctggctagaagcacaagaggaggaggaggtgggtt
ttcagctcacacctcaggtacctttaagaccaatgacttacaaggcagctgtagatcttagccacttttta
aaagaaaagggggactggaagggttaattcactcccaacgaagacaagatatccttgatctgtggatcta
ccacacacaaggctacttccctgattag

FIGURE 45

DNA Sequence of E^mΔC.N (Strain BH10) [SEQ ID NO: 22]:

Gaattcgccaccatgggagtggaaggagaaatatcagcacttgtggagatgg

EcoRI Kozak NcoI

gggtggagatggggcaccatgctccttgggatgttgatgatctgtagtgtacagaaaaattgtgggtcac
agtctattatggggtacctgtgtggaagggaagcaaccaccactctattttgtgcatcagatgctaagcat
atgatacagaggtacataatgtttgggccacacatgctgtgtacccacagaccccaaccacaagaagta
gtatttgtaaatgtgacagaaaaattttaacatgtggaaaaatgacatggtagaacagatgcatgaggat
aatcagtttatgggatcaaagcctaaagccatgtgtaaaaattaacccactctgtgttagtttaaagtga
ctgatttgaagaatgatactaataccaatagtagtagcgggagaatgataatggagaaaggagagataaaa
aactgctctttcaatatcagcacaagcataaagggttaagggtgcagaaagaatatgcattttttataaact
tgatataataccaatagataatgatactaccagctatacgttgacaagttgtaacacctcagtcattacac
aggcctgtccaaaggtatcctttgagccaattcccatatacattattgtgccccggctggttttgcgattcta
aaatgtaataataagacgttcaatggaacaggaccatgtacaaatgtcagcacagtacaatgtacacatgg
aattaggccagtagtatcaactcaactgctgttaaatggcagctctggcagaagaagaggtagtaattagat
ctgccaatttcacagacaatgctaaaaaccataatagtagcagctgaaccaatctgtagaaattaattgtaca
agaccaacaacaatacaagaaaaagtatccgtatccagagaggaccaggagagcatttgttacaatagg
aaaaataggaaatatgagacaagcacattgtaacattagtagagcaaaatggaataaacactttaaacaga
tagatagcaaatgaagaacaatttggaataataaaacaataatctttaagcagtcctcaggaggggac
ccagaaattgtaacgcacagttttaattgtggaggggaatttttctactgtaattcaacacaactgtttaa
tagtacttggtttaatagtacttggagtactaaagggtcaaataaacactgaagggaagtgcacaatcacc
tccatgcagaataaaacaattataaacatgtggcaggaagttaggaaaagcaatgtatgccccccatc
agtggacaaattagatgttcatcaaatattacagggtgctatttaacaagagatggtggtaatagcaaaa
tgagtccgagatcttcagacctggaggaggagatatgagggacaattggagaagtgaattatataaatata
aagtagtaaaaattgaaccattaggagtagcaccaccaaggcaagagaagagtgtgtgcagACTAGTgca
gtgggaataggagcttcttccctgggttcttgggagc

ΔCleavage site(agagaaaaaga)→SpeI

agcaggaagcactatgggcgcagcgtcaatgacgctgacggtagcaggccagacaattattgtctggtatag
tgcagcagcagaacaatttggctgagggctattgaggcgcaacagcatctgttgcaactcacagtctggggc
atcaagcagctccaggcaagaatcctggctgtggaagatacctaaaggatcaacagctcctggggatttg
gggttgctctgaaaaactcatttgcaccactgctgtgccttggaatgctagtgtgagtaataaatctctgg
aacagatttggaaataacatgacctggatggagtgggacagagaaaattaacaattacacaagcttaatacac
tccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattggaattagataaatgggc
aagtttgtggaattggtttaacataacaaattggctgtggtatataaaattattcataatgatagtaggag
gcttggtaggtttaagaatagtttttctgtactttctgtagtgaatagagttaggcaggatattcacca
ttatcgtttcagacccacctcccaatcccgaggggacccgacaggcccggaaggaatagaagaagaaggtgg
agagagagacagagacagatccattcgattagtgaacggatccttagcacttatctgggacgatctgcgga
gcctgtgcctcttcagctaccaccgcttgagagacttactcttgattgtaacgaggattgtggaactctg
ggacgcaggggggtgggaagccctcaaatattgggtggaatctcctacagtattggagtccaggagctaaagaa
tagtgctgttagcttgctcaatgccacagctatagcagtagctgaggggacagatagggttatagaagtag
tacaaggagcttatagagctattcgccacatacctagaagaataagacagggcttggaaaggatttgccta
taagatgggtggcaagtgggtcaaaaagtagtgtggttggtggcctgctgtaagggaagaatgagacgag
ctgagccagcagcagatggggtgggagcagcatctcgagacctagaaaaacatggagcaatcacaaagtagc
aacacagcagctaacaatgctgattgtgcctggctagaagcacaaaggaggaggaggtgggttttccagt
cacacctcaggtacctttaagaccaatgacttacaaggcagctgtagatcttagccactttttaaaagaaa
aggggggactggaagggttaattcactcccaacgaagacaagatatccttgatctgtggatctaccacaca
caaggctacttccctgattag

FIGURE 46

DNA Sequence of E^mΔCAT³⁰⁰.T (BH10) [SEQ ID NO: 23]:

Gaattctgcaacaactgctgtttatccattttcagaattgggtgtcgacat

EcoRI

Agcagaataggcgttactcgacagaggagagcaagaaatggagccagtaga

Tat 1

tcctagactagagccctggaagcatccaggaagtcagcctaaaactgcttgtaccaattgctattgtaaaa
agtgttgctttcattgccaagtttgtttcataacaaaagccttaggcatctcctatggcaggaagaagcgg
agacagcgacgaagacctcctcaaggcagtcagactcatcaagtttctctatcaaagcagtaagtagtaca
tgtaatgcaacctatacaaatagcaatagtagcattagtagtagcaataataatagcaatagttgtgtggt
ccatagtaatcatagaatataggaataattaagacaaaagaaaaatagacagggttaattgatagactaata
gaaagagcagaagacagtggtgcaatgagagtggaaggagaaatatcagcacttgtggagatgggggtggagat
ggggcaccatgctccttgggatgttgatgctgttagtgctacagaaaaattgtgggtcacagtctattat
ggggtacctgtgtggaagggaagcaaccaccactctatttgtgcatcagatgctaaagcatatgatacaga
ggtacataatgtttgggccacacatgcctgtgtaccacagaccccaaccacaagaagtagtattggtaa
atgtgacagaaaaatttaacatgtggaaaaatgacatggtagaacagatgcatgaggatataatcagttta
tgggatcaaagcctaaagccatgtgtaaaaattaacccactctgtgttagtttaaaagtgcactgatttgaa
gaatgatactaataccaatagtagtagcgaggagaatgataatggagaaaggagagataaaaaactgctctt
tcaatatcagcacaaagcataagaggtgaaggtgcagaaagaatatgcattttttataaaacttgatataata
ccaatagataatgatactaccagctatacgttgacaagttgtaaacacctcagtcattacacaggcctgtcc
aaagggtatcctttgagccaattcccatacattattgtgccccggctggttttgcgattctaaaatgtaata
ataagacgttcaatggaacaggaccatgtacaaatgtcagcacagtacaatgtacacatggaattaggcca
gtagtatcaactcaactgctgtttaaattggcagctctggcagaagaagaggtagtaattagatctgccattt
cacagacaatgctaaaaaccataatgtacagctgaaccaatctgtagaatttaattgtacaagaccaaca
acaatacaagaaaaagtatccgtatccagagaggaccagggagagcatttgttacaatagaaaaatagga
aatatgagacaagcacattgtaacattagtagagcaaaatggaataacactttaaaacagatagatagcaa
attaagagaacaatttggaaataataaaaacaataatctttaagcagtcctcaggaggggaccagaaattg
taacgcacagttttaaattgtggagggaatttttctactgtaattcaacacaactgtttaatagtacttgg
tttaatagtacttggagtactaaagggtcaaataacactgaaggaagtacacaatcacctcccatgacag
aataaaacaaattataaacatgtggcaggaagtaggaaagcaatgtatgcccctcccatcagtggaacaa
ttagatgttcatcaaatattacagggtgctattaacaagagatgggtgtaataagcaacaatgagtcagag
atcttcagacctggaggaggagatagagggacaattggagaagtgaattatataaatataaagttagtaaa
aattgaaccattaggagtagcaccaccaaggcaagagaagagtggtgcagACTAGTgcagtggaatag
gagctttgttccttgggttc

ΔCleavage site (agagaaaaaaga) → SpeI

ttgggagcagcaggaagcactatgggcgcagcgtcaatgacgctgacggtacaggccagacaattattgtc
tggtatagtgcagcagcagaacaatttgcgtgagggtcattgaggcgcaacagcatctgttgcaactcacag
tctggggcatcaagcagctccaggcaagaatcctggctgtggaaagatacctaaaggatcaacagctcctg
gggatttggggttgctctggaaaactcatttgcaccactgctgtgccttgggaatgctagttggagtaataa
atctctggaacagatttggaaataacatgacctggatggagtgaggacagagaaattaacaattacacaagct
taatacactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattggaattagat
aaatgggcaagtttgtggaattggtttaacataacaaattggctgtggtatataaaattattcataatgat
agtaggaggttggtaggtttaagaatagttttgctgtactttctgtagtgaatagagttaggcagggat
attcaccattatcgtttcagacccacctccaatcccaggggaccgcagagcccgaaaggaatagaagaa
gaaggtggagagagagacagagacagatccattcgattagtgaaaggatccttagcacttatctgggttaa

Figure 47

DNA Sequence of E^m/E^m (BH10) [SEQ ID NO: 24]:

Gaattcgccaccatgggagtgaggagaaaatatcagcacttgtggagatgg
EcoRI Kozak NcoI
gggtggagatggggcaccatgctccttgggatgttgatgatctgtagtgtacagaaaaattgtgggtcac
agtctattatgggttacctgtgtggaaggaagcaaccaccactctattttgtgcatcagatgctaaagcat
atgatacagaggtacataatgtttgggccacacatgctgtgtaccacagacccaaccacaagaagta
gtattggtaaatgtgacagaaaaattttaacatgtggaaaaatgacatggtagaacagatgcatgaggatat
aatcagtttatgggatcaaagcctaaagccatgtgtaaaattaacccactctgtgttagtttaagtgca
ctgatttgaagaatgataactaataccaatagtagtagcgggagaatgataatggagaaaggagagataaaa
aactgctctttcaatatcagcacaagcataagaggtaaggtgcagaaagaatatgcattttttataaaact
tgatataataccaatagataatgatactaccagctatacgttgacaagttgtaaacacctcagtcattacac
aggcctgtccaaaggtatcctttgagccaattcccatacattattgtgccccgctggttttgcgattcta
aaatgtaataataagacgttcaatgggaacaggacatgtacaaatgtcagcacagtacaatgtacacatgg
aattaggccagtagtatcaactcaactgctgttaaatggcagctctggcagaagaagaggtagtaattagat
ctgccaaatttcacagacaatgctaaaaccataatagtagcagctgaaccaatctgtagaaattaattgtaca
agacccaacaacaatacaagaaaaagtatccgtatccagagaggaccagggagagcatttgttacaatagg
aaaaataggaaatatgagacaagcacattgtaacattagtagagcaaaatggaataacactttaaaacaga
tagatagcaaatgaagagaacaatttggaaataataaaacaataatctttaagcagtcctcaggaggggac
ccagaaattgtaacgcacagttttaattgtggaggggaatttttctactgtaattcaacacaactgtttaa
tagtacttgggttaatatgtacttggagtactaaaggggtcaaataacactgaaggagtgacacaatcacc
tcccatgcagaataaaaacaaattataaacatgtggcaggaagtaggaaaagcaatgtatgccctcccatc
agtggacaaattagatgttcatcaaatattacagggctgctattaacaagagatgggtggtaatagcaaca
tgagtcagagatcttcagacctggaggaggagatagagggacaattggagaagtgaattatataaaatata
aagtagtaaaaattgaaccattagtagtagcaccaccaaggcaaagagaagagtggtgcagagagaaaaa
agagcagtggggaataggagctttgttccttgggttcttgggagcagcaggaagcactatgggcgcagcgtc
aatgacgctgacggtacagggcagacaattattgtctggtatagtgcagcagcagaacaatttgctgaggg
ctattgagggcgaacagcatctgttgcaactcacagctctggggcatcaagcagctccaggcaagaatcctg
gctgtggaagatacctaaaggatcaacagctcctggggatttgggggtgctctggaaaactcatttgcac
cactgctgtgccttgggaatgctagttggagtaataaatctctggaacagatttggaaataacatgacctgga
tggagtgggacagagaaatttaacaattacacaagcttaatacactccttaattgaagaatcgaaaaccag
caagaaaagaatgaacaagaattattggaattagataaatgggcaagtttgtggaattgggttaacataac
aaattggctgtggtatataaaattattcataatgatagtaggaggttggttaggtttaagaatagtttttg
ctgtactttctgtagtgaatagagtttaggcagggatattcaccattatcgtttcagacccacctccaatc
ccgaggggacccgacagggccgaagggaatagaagaagaaggtggagagagagacagagacagatccattcg
attagtgaacggatccttagcacttatctgggacgatctgcggagcctgtgcctcttcagctaccaccgct
tgagagacttactcttgattgtaacgaggattgtggaacttctgggacgcaggggtgggaagccctcaaa
tattgggtggaatctcctacagtattggagtcaggagctaagaagaatagtgtgttagcttgcctcaatgccac
agctatagcagtagctgaggggacagatagggttatagaagtagtacaaggagcttatagagctattcgcc
acatacctagaagaataagacagggccttggaaaggattttgctataa

FIGURE 48

Sequences of V3 loop Multi-clade HIV-1 Clones:

Clade	ACC#	HIV-1 Strain	From(nt)	To(nt)
B	M15654	BH10	885	992
A	U09127	192UG037WHO.01083hED	888	992
C	U09126	192BR025WHO.01093hED	876	980
D	U43386	192UG024.2	888	989
E	U08458	193TH976.17	894	998
F	U27401	193BR020.17	888	992
G	U30312	192RU131.9	885	989

Tgtacaagacccaacaacaataacaagaaaaagtatccgtatccagagagga
ccagggagagcatttggttacaataggaaaaataggaaatatgagacaagca
cattgt **Clade B [SEQ ID NO: 25]**

Tgtaccagacctaacaacaataacaagaaaaagtgtacgtataggaccagga
caaacattctatgcaacagggtgatataataggggatataagacaagcacat
tgt **Clade A [SEQ ID NO: 26]**

Tgtacgagacccaacaataataacaagaaaaagtataaggataggaccagga
caagcattctatgcaacaggagaaataataggagatataagacaagcacat
tgt **Clade C [SEQ ID NO: 27]**

Tgcacaaggccctacaacaataataagacaaaaggacccccataggactaggg
caagcactctataacaagaagaatagaagatataagaagagcacattgt
Clade D [SEQ ID NO: 28]

Tgtaccagaccctccaccaataacaagaacaagtatacgtataggaccagga
caagtattctatagaacaggagacataacaggagatataagaaaagcatat
tgt **Clade E [SEQ ID NO: 29]**

Tgtacaagacccaacaacaataacaagaaaaagaatatcttttaggaccagga
cgagtattttatacagcaggagaaataataggagacatcagaaaggcacat
tgt **Clade F [SEQ ID NO: 30]**

Tgtaccagacctaataacaataacaagaaaaagtataacttttgcaccagga
caagcgctctatgcaacagggtgaaataataggagatataagacaagcacat
tgt **Clade G [SEQ ID NO: 31]**

FIGURE 49A

DNA sequence of modified Env including multi-clade V3 loops [SEQ ID NO: 32]:

Atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatggggcaccatgctccttgggat
gttgatgatctgtagtgtacagaaaaattgtgggtcacagtctattatggggtagctgtgtggaaggaag
caaccaccactctatTTTTGTGcatcagatgctaagcatatgatacagaggtacataaatgtttgggcaca
catgctgtgtacccacagaccccaaccacaagaagtagtatttgtaaattgtacagaaaaatttaacat
gtggaaaaatgacatggttagaacagatgcatgaggatataatcagtttatgggatcaaagcctaagccat
gtgtaaaattaacccactctgtgtt**ggaagctggtagttgtaacacctcagt**

V1, V2 deletion, GAG insertion

Cattacacaggcctgttccaaaggtatcctttgagccaattcccatacattattgtgcccggtgtgttttg
cgattctaaaaatgtaataataagacgttcaattggaacaggaccatgtacaaatgtcagcacagtacaatgt
acacatggaattaggccagtagtatcaactcaactgctgttaaattggcagctctggcagaagaagaggttagt
aattagatctgccaaatttcacagacaatgctaaaaccataatgtacagctgaaccaatctgtagaatta
att**gtacaagaccaacaaca**

Start of Clade B

Tacaagaaaaagtatccgtatccagagaggaccaggagagcatttgttacaataggaaaaataggaaata
tgagacaagcacattgt**ctcgggtgtaccag**

Insert a *Ava*I site Clade A

Acctaacaacaatacagaaaaagtgatgtaggaccaggacaaacattctatgcaacagggtgatataa
taggggatataagacaagcacattgt**gtac**

Clade C

Gagcccaacaataatacagaaaaagtataaggataggaccaggacaagcattctatgcaacaggagaaa
taataggagatataagacaagcacattgt**tg**

Clade D

Cacaaggccctacaacaataataagacaaaggacccccataggactagggaagcactctataacaagaa
gaatagaagatataagaagagcacattgt**tg**

Clade E

Taccagacctccaccaatacagaacaagtatacgtataggaccaggacaagtattctatagaacaggag
acataacaggagatataagaaaagcatattgt**ggatcctgt**tacaagaccaacaacaatacagaaaaaga
atatcctttagg

BamHI clade F

AccaggacgagtatTTTTTatagcaggagaaataataggagacatcagaaaggcacattgt**gtaccagac**
ctaataacaatacagaaaaagtataacttt

Clade G

Tgcaccaggacaagcgctctatgcaacagggtgaataataggagatataagacaagcacattgt**ctcggga**
acattagtagagcaaaatggaataacacttt

Insert a *Ava*I

Aaaacagatagatagcaaattaagagaacaatttggaaataataaaacaataatctttaagcagtcctcag
gaggggaccagaaattgtaacgcacagttttaattgtggagggaatttttctactgtaattcaacacaa
ctgtttaatagtacttggtttaatagtacttggagtactaaaggtcaaataacactgaaggaagtgcac
aatcacccctcccatgcagaataaaacaaattataaacatgtggcaggaagtaggaaaagcaatgtatgcc
ctcccatcagtggaacaaattagatgttcatcaaatattacagggctgctattaacaagagatgggtgta
agcaacaatgagtcagagatcttcagacctggaggaggagatagagggaacattggagaagtgaattata
taaataaaagttagtaaaaattgaaccattaggagtagcaccaccaaggcaagagaagagtggtgcaga
ctagtgcagtggg

Cleavage site mutation (*Spe*I)

Aataggagctttgttccttgggttcttgggagcagcaggaagcactatgggcgcagcgtcaatgacgctga
cggtagaggccagacaattattgtctggtatagtgcagcagcagaacaatttgcctgagggtcattgagcg
caacagcatctgttgcaactcacagtctggggcatcaagcagctccaggcaagaatcctggctgtggaag
atacctaaaggatcaacagctcctggggatttgggggtgctctggaaaactcatttgcaccactgctgtgc
cttggaaatgctagtgtgagtaataaatctctggaacagatttggaaataacatgacctggatggagtgga
agagaaattaaacaattacacaagcttaatacactccttaattgaagaatcgcaaaaccagcaagaaaaa
tgaacaagaattattggaattagataaatgggcaagtttgggaattggtttaacataacaattggctgt
ggtatataaaat**ctgtggctgctgctgctcctcctcctcctcaggccacggatttcattgtcc**
ctgtga

GPI anchor

Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	T	E	K	L	F	V
A	V	Y	Y	G	V	P	V	W	K	E	A	N	T	T	L	W	C
A	S	D	A	K	A	P	D	T	E	E	H	N	V	T	A	F	H
E	C	V	P	T	D	N	N	P	Q	V	V	V	L	W	L	T	T
I	N	F	N	M	W	K	N	D	M	E	E	Q	M	H	A	V	I
V	S	L	W	D	Q	S	N	T	P	V	V	K	L	C	N	L	C
S	G	A	G	S	C	N	I	H	K	C	T	A	A	F	P	K	V
K	Q	E	P	K	P	I	F	S	Y	V	P	A	G	C	A	I	S
V	N	N	T	E	T	E	Q	P	V	I	S	E	T	N	V	L	T
G	A	S	A	I	G	K	I	R	V	N	S	I	R	F	L	T	N
A	P	T	I	N	V	R	S	G	R	I	Q	R	H	N	C	R	N
P	F	P	N	G	K	I	I	K	I	R	I	I	G	P	G	G	R
F	T	A	N	N	D	T	R	G	S	D	I	Q	A	H	C	Q	A
T	F	N	T	E	T	I	R	I	R	I	P	G	A	P	C	C	T
R	Y	P	N	I	R	Q	I	R	I	R	I	G	L	G	Q	A	F
Y	P	A	N	I	E	D	I	R	I	R	I	A	C	H	C	T	R
P	A	T	N	T	S	I	R	I	R	I	A	P	Q	G	A	L	Y
T	N	R	R	T	D	I	I	K	R	I	P	I	Q	C	R	P	S
T	G	I	T	G	K	I	I	S	A	L	G	C	Q	V	F	R	T
G	N	N	I	R	G	R	I	R	F	K	C	G	G	T	R	R	P
N	A	E	I	I	S	D	I	Q	Q	A	P	Q	L	C	Y	P	T
A	N	T	N	K	T	I	I	F	K	A	H	C	Q	S	I	A	N
G	A	I	N	S	I	I	R	G	G	I	D	Q	L	N	E	S	R
A	V	N	K	T	N	I	F	N	E	I	S	G	K	R	P	Q	F
V	L	H	S	F	W	C	G	T	P	Q	S	N	C	D	G	A	I
L	T	G	S	D	G	E	A	L	P	E	R	G	K	P	I	Q	N
T	M	Q	S	V	I	K	T	M	V	Y	P	S	I	V	G	S	N
R	N	S	S	N	T	F	Y	L	V	G	T	E	I	G	A	Q	I
R	P	E	S	E	I	R	R	A	Q	V	I	A	D	R	Q	T	N
P	L	K	L	A	Q	A	W	E	A	A	S	I	M	L	A	V	G
T	N	L	Q	L	I	R	E	I	Q	I	G	L	I	Y	T	L	K
G	Q	W	N	G	Q	A	D	C	S	A	V	E	Q	C	W	I	N
V	M	I	M	A	S	W	R	N	I	R	N	N	I	I	E	L	L
S	E	D	K	E	S	S	N	Q	Q	K	F	N	E	S	N	L	Q
E	W	I	K	W	A	L	L	W	L	L	L	S	I	T	L	W	
W	A	D	F	M	S	L	*	L					L	S	L		

FIGURE 50A

1. DNA sequence of p17/24 in natural form [SEQ ID NO: 34]:

atgggtgcgagagcgtcagtattaaagcgggggagaattagatcgatgggaaaaaattcggttaaggccagg
gggaaagaaaaataataaataaaacatatagtagggcaagcaggagctagaacgattcgcagttaatc
ctggcctgttagaaaacatcagaaggctgtagacaaatactgggacagctacaacccatcccttcagacagga
tcagaagaacttagatcattatataatacagtagcaaccctctattgtgtgcatcaaaggatagagataaa
agacaccaaggaagcctttagacaagatagaggaagagcaaaacaaaagtaagaaaaagcacagcaagcag
cagctgacacaggacacagcagtcaggtcagccaaaattaccctatagtgagaacatccaggggcaaatg
gtacatcaggccatcacctagaactttaaatgcatgggtaaaagtagtagaagagaaggctttcagccc
agaagtaatacccatgttttcagcattatcagaaggagccacccacaagatttaaacaccatgctaaaca
cagtggggggacatcaagcagccatgcaaatgttaaaagagaccatcaatgaggaagctgcagaatgggat
agagtacatccagtgcagggcctattgcaccaggccagatgagagaaccaaggggaagtgcacatagc
aggaaactactagtacccttcaggaacaaaataggatggatgacaaaataatccacctatcccagtaggagaaa
ttataaaaagatggataatcctgggattaaaataaaaatagtaagaatgtatagccctaccagcattctggac
ataagacaaggacaaaagaaccttttagagactatgtagaccggttctataaaaactctaagagccgagca
agcttcacaggaggtaaaaaattggatgacagaaaccttgttgggtccaaaatgcgaaccagattgtaaga
ctattttaaaagcattgggaccagcggctacactagaagaaatgatgacagcatgtcaggagtaggagga
cccgccataaggcaagagttttgtaa

2. DNA sequence of p17/24 in secreted form [SEQ ID NO: 35]:

atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatgg

gp120 signal peptide

ggcaccatgctccttgggatgttgatgctgtagtgcctggcgagagcg

p17/p24

tcagtattaaagcgggggagaattagatcgatgggaaaaaattcggttaaggccagggggaaagaaaaata
taaattaaaacatatagtagggcaagcaggagctagaacgattcgcagttaatcctggcctgttagaaa
catcagaaggctgttagacaaatactgggacagctacaacccatcccttcagacaggatcagaagaacttaga
tcattatataatacagtagcaaccctctattgtgtgcatcaaaggatagagataaaagacaccaaggaagc
tttagacaagatagaggaagagcaaaacaaaagtaagaaaaagcacagcaagcagcagctgacacaggac
acagcagtcaggtcagccaaaattaccctatagtgagaacatccaggggcaaatggtagatcaggccata
tcacctagaactttaaatgcatgggtaaaagtagtagaagagaaggctttcagcccagaagtaatacccat
gttttcagcattatcagaaggagccacccacaagatttaaacaccatgctaaacacagtggggggacatc
aagcagccatgcaaatgttaaaagagaccatcaatgaggaagctgcagaatgggatagagtacatccagt
catgcagggcctattgcaccaggccagatgagagaaccaaggggaagtgcacatagcaggaactactagtac
ccttcaggaacaaaataggatggatgacaaaataatccacctatcccagtaggagaaatttataaaaagatgga
taatcctgggattaaaataaaaatagtaagaatgtatagccctaccagcattctggacataagacaaggacca
aaagaaccttttagagactatgtagaccggttctataaaaactctaagagccgagcaagcttcacaggaggt
aaaaaattggatgacagaaaccttgttgggtccaaaatgcgaaccagattgtaagactattttaaaagcat
tgggaccagcggctacactagaagaaatgatgacagcatgtcaggagtaggaggacccggccataaggca
agagttttgtaa

FIGURE 50A -continued

1. DNA sequence of p17/24 in membrane form [SEQ ID NO: 36]:

atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatgg

gp120 signal peptide

Ggcaccatgctccttgggatgttgatgatctgtagtgctggtgcgagagcg

P17/p24

tcaagtattaagcgggggagaattagatcgatgggaaaaattcggttaaggccaggggaaagaaaaata
taaattaaaaacatatagtatgggcaagcaggagctagaacgattcgcagttaatcctggcctgttagaaa
catcagaaggctgtagacaaatactgggacagctacaacatcccttcagacaggatcagaagaacttaga
tcattatataatacagtagcaaccctctattgtgtgcatcaaaggatagagataaaagacaccaaggaagc
tttagacaagatagagggaagagcaaaaacaaaagtaagaaaaaagcacagcaagcagcagctgacacaggac
acagcagtcaggtcagccaaaattaccctatagtgcagaacatccaggggcaaattggtacatcaggccata
tcacctagaactttaaatgcatgggtaaaagtagtagaagagaaggctttcagcccagaagtaatacccat
gttttcagcattatcagaaggagccaccccacaagatttaaacacccatgctaaacacagtggggggacatc
aagcagccatgcaaattgttaaagagaccatcaatgaggaagctgcagaatgggatagagtacatccagt
catgcagggcctattgcaccaggccagatgagagaaccaagggggaagtgcatagcaggaaactactagtac
ccttcaggaaacaaataggatggatgacaaataatccacctatcccagtagggagaaatttataaaagatgga
taatcctgggattaaataaaaatagtaagaatgtatagccctaccagcattctggacataagacaaggacca
aaagaaccttttagagactatgtagaccggttctataaaactctaagagccgagcaagcttcacaggaggt
aaaaaattggatgacagaaaccttgttggtccaaaatgcgaacccagattgtaagactattttaaaagcat
tgggaccagcggctacactagaagaaatgatgacagcatgtcaggagtaggaggaccggccataaggca
agagttttg

ttattcataatgatagtaggagccttggttaggttaagaatagtttttgcgtgtactttctgtagtgaatag
agttaggcagggatattcaccattatcgtttcagacccacctcccaatcccaggggataa

gp41 transmembrane domain

Sequence 50A

FIGURE 50B

1. Amino acid sequence of p17/24 in natural form [SEQ ID NO: 37]:

M	G	A	R	A	S	V	L	S	G	G	E	L	D	R	W	E	K
I	R	L	R	P	G	G	K	K	K	Y	K	L	K	H	I	V	W
A	S	R	E	L	E	R	F	A	V	N	P	G	L	L	E	T	S
E	G	C	R	Q	I	L	G	Q	L	Q	P	S	L	Q	T	G	S
E	E	L	R	S	L	Y	N	T	V	A	T	L	Y	C	V	H	Q
R	I	E	I	K	D	T	K	E	A	L	D	K	I	E	E	S	Q
N	K	S	K	K	K	A	Q	Q	A	A	D	T	G	H	S	V	S
Q	V	S	Q	N	Y	P	I	V	Q	N	I	Q	G	Q	M	E	H
Q	A	I	S	P	R	T	L	N	A	W	V	K	V	V	E	E	K
A	F	S	P	E	V	I	P	M	F	S	A	L	S	E	G	A	T
P	Q	D	L	N	T	M	L	N	T	V	A	G	H	Q	A	A	M
Q	M	H	K	E	T	I	N	E	A	A	E	R	E	P	R	G	S
P	V	A	G	T	T	S	T	L	Q	E	Q	I	G	W	M	T	N
D	I	A	P	P	V	G	E	I	Y	K	R	W	I	I	L	G	L
N	P	P	I	P	M	Y	S	P	T	S	I	L	D	I	R	Q	G
N	K	I	V	R	M	D	Y	V	D	R	F	Y	K	T	L	V	A
P	K	A	S	Q	E	V	K	N	W	M	T	E	T	L	L	A	Q
E	Q	A	P	D	C	K	T	I	L	K	A	L	G	P	A	A	T
N	A	N	P	M	T	A	C	Q	G	V	G	G	P	G	H	K	A
L	E	E	*														
R	V	L															

2. Amino acid sequence of p17/24 in secreted form [SEQ ID NO: 38]:

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	G	A	R	A	S	V
L	S	G	G	E	L	D	R	W	E	K	I	R	L	R	P	G	R
K	K	K	Y	K	L	K	H	I	V	W	A	S	R	E	L	E	R
F	A	V	N	P	G	L	L	E	T	S	E	G	C	R	Q	I	L
G	Q	L	Q	P	S	L	Q	E	G	S	E	E	L	R	S	L	Y
N	T	V	A	T	L	Y	C	V	H	Q	R	I	E	I	K	D	T
K	E	A	L	D	K	I	E	E	E	Q	N	K	S	K	K	K	A
Q	Q	A	A	A	D	T	G	H	S	S	Q	V	S	Q	N	Y	P
Q	Q	A	A	A	D	T	G	H	S	S	Q	V	S	Q	N	Y	P
I	V	Q	N	I	Q	G	Q	M	V	H	Q	A	I	S	P	R	T
L	N	A	W	V	K	V	V	E	E	K	A	F	S	P	E	V	I
P	M	F	S	A	L	S	E	G	A	T	P	Q	D	L	N	T	M
L	N	E	V	G	E	H	Q	A	V	H	P	V	H	K	E	T	I
A	P	G	Q	M	R	E	P	R	G	S	D	I	A	G	T	P	S
T	L	Q	E	Q	I	G	W	M	T	N	N	P	P	I	P	V	G
E	I	Y	K	R	I	W	I	I	L	G	N	K	I	V	R	F	Y
S	P	T	S	I	L	D	I	R	Q	A	P	Q	E	S	Q	M	D
Y	V	D	R	F	Y	K	T	L	R	A	E	Q	A	S	F	R	V
T	I	L	K	A	L	G	P	A	A	T	L	E	E	M	M	T	A
C	Q	G	V	G	G	P	G	H	K	A	R	V	L	*			

FIGURE 50B-continued

1. Amino acid sequence of p17/24 in membrane bound form [SEQ ID NO: 39]:

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	G	A	R	A	S	V
L	S	G	G	E	L	D	R	W	E	K	I	R	L	R	P	G	G
K	S	K	Y	E	L	D	R	W	E	K	I	R	L	R	P	G	G
F	K	V	N	K	L	K	H	I	V	S	A	S	R	E	L	E	R
G	A	L	Q	P	G	L	L	E	T	S	E	G	C	R	Q	I	L
N	Q	V	A	T	S	Y	Q	T	G	Q	R	E	L	I	K	D	K
K	T	A	A	D	L	I	C	V	H	S	N	I	S	K	K	Y	T
Q	Q	A	N	A	Q	T	E	M	S	H	Q	V	I	S	N	R	A
I	V	A	W	I	K	G	Q	E	V	K	A	F	S	P	P	V	P
L	N	F	S	V	L	S	V	G	A	T	P	Q	D	L	E	T	I
P	N	T	A	A	G	H	Q	A	A	M	Q	M	H	K	G	T	M
L	E	E	Q	A	E	W	D	R	V	H	P	V	A	A	T	I	I
N	P	G	K	M	R	E	P	M	G	S	D	I	P	I	P	V	S
A	T	Y	S	Q	I	D	W	L	Q	N	N	K	E	V	R	M	G
T	S	T	R	R	W	K	I	L	R	L	P	Q	A	P	F	R	D
E	S	D	M	F	L	T	L	L	V	A	E	A	N	S	Q	E	V
S	Y	W	K	A	E	G	P	A	A	Q	N	E	L	P	D	C	K
K	T	L	V	G	G	P	G	H	K	T	L	V	L	M	M	T	A
C	I	G	R	L	V	Y	S	R	I	A	R	A	T	V	F	I	M
I	N	V	*	Q	G	G	L	P	L	V	F	Q	L	H	S	V	V
P	R	G															I

2013-10-10 10:00:00

FIGURE 51A

1. DNA sequence of p17 in natural form [SEQ ID NO: 40]:

atgggtgcgagagcgtcagtattaagcgggggagaattagatcgatgggaaaaaattcg
gttaaggccagggggaaagaaaaaatataaattaaaacatatagtatgggcaagcaggg
agctagaacgattcgcagttaatcctggcctgttagaaacatcagaaggctgtagacaa
atactgggacagctacaacatcccttcagacaggatcagaagaacttagatcattata
taatacagtagcaaccctctattgtgtgcatcaaaggatagagataaaagacaccaagg
aagctttagacaagatagaggaagagcaaaacaaaagtaagaaaaaagcacagcaagca
gcagctgacacaggacacagcagtcaggtcagccaaaattactaa

2. DNA sequence of p17 in secreted form [SEQ ID NO: 41]:

atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatgg
gp120 signal peptide
ggcaccatgctccttgggatgttgatgatctgtagtgtggtgcgagagcg

p17

tcagtattaagcgggggagaattagatcgatgggaaaaaattcgggttaaggccaggggg
aaagaaaaaatataaattaaaacatatagtatgggcaagcagggagctagaacgattcg
cagttaatcctggcctgttagaaacatcagaaggctgtagacaaatactgggacagcta
caacatcccttcagacaggatcagaagaacttagatcattatataatacagtagcaac
cctctattgtgtgcatcaaaggatagagataaaagacaccaaggaagctttagacaaga
tagaggaagagcaaaacaaaagtaagaaaaaagcacagcaagcagcagctgacacagga
cacagcagtcaggtcagccaaaattactaa

3. DNA sequence of p17 in membrane bound form [SEQ ID NO: 42]:

atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatgg
gp120 signal peptide
ggcaccatgctccttgggatgttgatgatctgtagtgtggtgcgagagcg

p17

tcagtattaagcgggggagaattagatcgatgggaaaaaattcgggttaaggccaggggg
aaagaaaaaatataaattaaaacatatagtatgggcaagcagggagctagaacgattcg
cagttaatcctggcctgttagaaacatcagaaggctgtagacaaatactgggacagcta
caacatcccttcagacaggatcagaagaacttagatcattatataatacagtagcaac
cctctattgtgtgcatcaaaggatagagataaaagacaccaaggaagctttagacaaga
tagaggaagagcaaaacaaaagtaagaaaaaagcacagcaagcagcagctgacacagga
cacagcagtcaggtcagccaaaattac
ttattcataatgatagtaggaggttggtaggtttaagaatagtttttgctgtactttc
tgtagtgaatagagttaggcagggatattcaccattatcgtttcagacccacctccaa
tcccaggggataa

gp41 transmembrane domain

[illegible][illegible]

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	G	A	R	A	S	V
L	S	G	G	E	L	D	R	W	E	K	I	R	L	P	G	R	G
K	S	K	Y	K	L	K	H	I	V	W	A	S	R	E	E	I	L
F	A	V	N	P	G	L	L	E	T	S	E	G	C	R	Q	I	L
G	Q	L	Q	P	S	L	Q	T	G	S	E	E	L	R	S	L	Y
G	Q	L	Q	P	S	L	Q	T	G	S	E	E	L	R	S	L	Y
N	T	V	A	T	L	Y	C	V	E	R	R	I	E	I	K	D	T
K	E	A	A	D	K	I	E	E	Q	Q	N	K	S	K	K	K	A
Q	E	A	A	A	D	T	G	H	S	S	Q	V	S	Q	N	Y	*

[illegible]

FIGURE 52B

1. Amino acid sequence of p24 in natural form [SEQ ID NO: 49]:

M	P	I	V	Q	N	I	Q	G	Q	M	V	H	Q	A	I	S	P
R	T	L	N	A	W	V	K	V	V	E	E	K	A	F	S	P	E
V	I	P	M	F	S	A	L	S	E	G	A	T	P	Q	D	L	N
T	M	L	N	T	V	A	G	H	Q	A	M	H	P	M	H	K	E
T	I	N	E	E	A	A	E	W	D	R	V	S	D	I	A	G	T
P	I	A	P	G	Q	M	R	E	P	R	G	S	D	I	A	G	T
T	S	T	L	Q	E	Q	I	G	W	M	T	N	N	P	P	I	P
V	G	E	I	Y	K	R	W	I	I	L	G	L	N	K	I	V	R
M	Y	S	P	T	S	I	L	D	I	R	Q	G	P	K	E	P	F
R	D	Y	V	D	R	I	Y	K	T	L	R	A	E	A	E	S	A
E	V	K	N	W	M	T	E	T	L	L	V	Q	N	Q	A	N	Q
C	K	T	I	L	K	A	L	G	P	A	A	T	L	E	E	M	D
T	A	C	Q	G	V	G	G	P	G	H	K	A	R	V	L	*	M

2. Amino acid sequence of p24 in secreted form [SEQ ID NO: 50]:

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	P	I	V	Q	N	I
Q	G	Q	M	V	H	Q	A	I	S	P	R	T	L	N	A	W	V
K	V	V	E	E	K	A	F	S	P	E	V	I	P	M	F	S	A
L	S	E	G	A	T	P	Q	D	L	N	T	M	L	N	T	V	A
G	H	Q	A	A	M	Q	M	L	K	E	T	I	N	E	E	A	A
E	W	D	R	V	H	P	V	H	A	G	P	I	A	P	G	Q	M
R	E	P	R	G	S	D	I	A	G	T	T	S	T	L	Q	E	Q
I	G	W	M	T	N	N	P	I	P	I	V	G	E	I	Y	K	R
W	I	I	L	G	L	N	K	I	V	R	M	Y	S	P	T	S	I
L	D	I	R	Q	G	P	K	E	P	F	R	D	Y	V	D	R	F
Y	K	T	L	R	A	E	Q	A	S	Q	E	V	K	N	W	M	T
E	T	L	L	V	Q	N	A	N	P	D	C	K	T	I	L	K	A
L	G	P	A	A	T	L	E	N	M	M	T	A	C	Q	G	V	G
G	P	G	H	K	A	R	V	L	*								

3. Amino acid sequence of p24 in secreted form [SEQ ID NO: 51]:

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	P	I	V	Q	N	I
Q	G	Q	M	V	H	Q	A	I	S	P	R	T	L	N	A	W	V
K	V	V	E	E	K	A	F	S	P	E	V	I	P	M	F	S	A
L	S	E	G	A	T	P	Q	D	L	N	T	M	L	N	T	V	A
G	H	Q	A	A	M	Q	M	L	K	E	T	I	N	E	E	A	A
R	E	P	R	G	S	D	I	A	G	T	T	S	T	L	Q	E	Q
I	G	W	M	T	N	N	P	I	P	I	V	G	E	I	Y	K	R
W	I	I	L	G	L	N	K	I	V	R	M	Y	S	P	T	S	I
L	D	I	R	Q	G	P	K	E	P	F	R	D	Y	V	D	R	F
Y	K	T	L	R	A	E	Q	A	S	Q	E	V	K	N	W	M	T
E	T	L	L	V	Q	N	A	N	P	D	C	K	T	I	L	K	A
L	G	P	A	A	T	L	E	N	M	M	T	A	C	Q	G	V	G
G	P	G	H	K	A	R	V	L	F	S	I	M	I	V	G	R	Q
V	G	L	R	I	V	F	A	V	L	S	V	V	N	R	G	*	
G	Y	S	P	L	S	F	Q	T	H	L	P	I	P	R			

FIGURE 53A

DNA sequence of modified Env including multi-clade V3 loops and Tat
[SEQ ID NO: 52]:

Gaattctgcaacaactgctgtttatccattttcagaattgggtgtcgacatagcagaataggcgt
tactcgacagaggagagcaagaaatggagccagtagatcctagactagagccc

Tat1

Tggaagcatccaggaagtgcagcctaactgcttgtagcaattgctattgtaaaaagtgttgctt
tcattggccaagtttgtttcatacaaaaagccttaggcattctcctatggcaggaagaagcggagac
agcgacgaagacctcctcaaggcagtcagactcatcaagtttctctatcaaagcagtaagtagta
catgtaatgcaacctatacaaatagcaatagtagcattagtagtagcaataataatagcaatagt
tgtgtgggtccatagtaatcatagaatataggaaaatattaagacaaaagaaaaatagacaggttaa
ttgatagactaatagaaagagcagaagacagtggaatgagagtggaaggagaaatatcagcactt
gtggagatgggggtggagatggg

Envelope

Gcaccatgctccttgggatgttgatgatctgtagtgtacagaaaaattgtgggtcacagtctat
tatggggtacctgtgtggaaggaagcaaccaccactctattttgtgcatcagatgtctaaagcata
tgatacagaggtacataatgttttggccacacatgcctgtgtaccacagaccccaaccacaag
aagtagtattggtaaatgtgacagaaaattttaacatgttggaataatgacatggtagaacagagt
catgaggatataatcagtttatgggatcaaagcctaaagccatgtgtaaaaattaaccccactctg
tgttggagctggtagttgtaacacctca

Delete V1V2, insert Gly,Ala,Gly

gtcattacacaggcctgtccaaaggtatcctttgagccaattcccatacattattgtgccccggc
tggttttgcgattctaaaatgtaataataagacgttcaatggaacaggaccatgtacaaatgtca
gcacagtacaatgtacacatggaattaggccagtagtatcaactcaactgctgttaaattggcagt
ctggcagaagaagaggtagtaattagatctgcgaatttcacagacaatgctaaaaccataatagt
acagctgaaccaatctgtagaaattaattgtacaag

First multi-clade repeat

Acccaacaacaatacaagaaaaagtatccgtatccagagaggaccagggagagcatttgtttacaa
taggaaaaataggaaatatgagacaagcacattgtctcggtgtaccagacctaacaacaataca
agaaaaagtgtacgtataggaccaggacaaacattctatgcaacaggtgatataataggggatat
aagacaagcacattgttgtacgagacccaacaataatacaagaaaaagtataaggataggaccag
gacaagcattctatgcaacaggagaaataataggagatataagacaagcacattgttgacacaagg
cctacaacaataataagacaaaggacccccataggactagggcaagcactctatacaacaagaag
aatagaagatataagaagagcacattgttgtaccagaccctccaccaatacaagaacaagtatac
gtataggaccaggacaagtattctatagaacaggagacataacaggagatataagaaaagcatat
tgtggatcctgtacaagaccaacaacaatacaagaaaaagaatatctttaggaccaggacgagt
attttatacagcaggagaaataataggagacatcagaaaggcacattgttgtaccagacctaata
acaatacaagaaaaagtataacttttgcaccaggacaagcgctctatgcaacaggtgaaataata
ggagatataagacaagcacattgtctcgggtgtaccagacctaacaacaata

Second multi-clade repeat

Caagaaaaagtgtacgtataggaccaggacaaacattctatgcaacaggtgatataataggggat
ataagacaagcacattgttgtacgagacccaacaataatacaagaaaagtataaggataggacc
aggacaagcattctatgcaacaggagaaataataggagatataagacaagcacattgttgacaaa
ggcctacaacaataataagacaaaggacccccataggactagggcaagcactctatacaacaaga
agaatagaagatataagaagagcacattgttgtaccagaccctccaccaatacaagaacaagtat
acgtataggaccaggacaagtattctatagaacaggagacataacaggagatataagaaaagcat
attgtggatcctgtacaagaccaacaacaatacaagaaaaagaatatctttaggaccaggacga
gtattttatacagcaggagaaataataggagacatcagaaaggcacattgttgtaccagacctaa
taacaatacaagaaaaagtataacttttgcaccaggacaagcgctctatgcaacaggtgaaataa

FIGURE 53A-continued

taggagatataagacaagcacattgtctcgggaacattagtagagcaaaatggaataacacttt

AvaI site, end of two multi-clade repeat

Aaaacagatagatagcaaattaagagaacaatttggaaataataaaaacaataatctttaagcagt
cctcaggaggggacccagaaattgtaacgcacagttttaattgtggaggggaatttttctactgt
aattcaacacaactgtttaatagtacttgggttaatagtacttggagtactaaaggggtcaaataa
cactgaaggaagtgcacacaatcacccctcccatgcagaataaaaacaaattataaacatgtggcagg
aagtaggaaaagcaatgtatgccctcccatcagtgggacaaaattagatgttcatcaaattattaca
gggctgtctattaacaagagatgggtgtaataagcaacaatgagtcagagatcttcagacctggagg
aggagatatgagggacaattggagaagtgaattatataaatataaagtagtaaaaattgaacat
taggagtagcaccacccaaggcaaagagaagagtggtgcagactagtgcagtgggaataggagct
ttgttccttgg

Delete the cleavage site, insert SpeI site

gttcttgggagcagcaggaagcactatgggcgcagcgtcaatgacgctgacgggtacaggccagac
aattattgtctggtatagtgcagcagcagaacaatttgcctgagggctattgagggcgcaacagcat
ctgttgcaactcacagctctggggcatcaagcagctccaggcaagaatcctggctgtggaaagata
cctaaaggatcaacagctcctggggatttgggggtgctctggaaaactcatttgcaccactgctg
tgccttgggaatgctagtgtgagtaataaatctctggaacagatttggaaataacatgacctggatg
gagtgggacagagaaaattaacaattacacaagcttaatacactccttaattgaagaatcgcaaaa
ccagcaagaaaagaatgaacaagaattatttggattagataaatgggcaagtttgtggaattggt
ttaacataacaaattggctgtggtatataaaattattcataatgatagtaggaggcttggttaggt
ttaagaatagtttttgcgtgtactttctgtagtgaatagagtttaggcagggatattcaccattatc
gtttcagacccacctcccaatcccagggggacccgacaggcccgaaggaatagaagaagaagggtg
gagagagagacagagacagatccattcgattagtgaaacggatccttagcacttatctggttaa

gp41, delete the 300 bp at C-terminal

300bp "53A-continued"

FIGURE 53B

**Amino acid sequence of modified Env including multi-clade V3 loops and Tat
[SEQ ID NO: 53]:**

```

M T A A E I V S K V G A P F T F R Y P T T G N A N G N T N G N R R T T I R I N K S S S E S S L A G V R Q L N M E K K T G L
R M V S C N S G F C Q S K N V R Y P A Y T N D N G N E I I T G R I K G R I R R I I T R K F G N T A G R K V A Q A R G S R N L M I D
V L Y D V F L A E N C L T N T P A N T N R R T I N E T I N D T I R E S D K G S D I R D I I L I C F I K F Y R G R E A W D Q S I P R *
K L Y A P N W G P N T A I N I N T N G N R R T I R I Q D D I R D I I L I C F I K F Y R G R E A W D Q S I P R *
E G G K T M D S I K H E I T G N G N E I I T G R I K G R I R R I I T R K F G N T A G R K V A Q A R G S R N L M I D
K M V A D W Q C P T G E V R K N D T I R E S D K G S D I R D I I S D I P R G A L K A A I Q E T P Y L G V Q G L Q L S K I Q N V R D
Y L P Y P K S N I F I E Q K I T I R I Q D D I R D I I S D I P R G A L K A A I Q E T P Y L G V Q G L Q L S K I Q N V R D
Q M V D N N L T H N R V L S G R I K G R I R R I I T R V I R R I A P Y G A P H D S F W C A L G K T S S H A G S N E W G G R
H I W T P D K S Y G P V N I N K G S D T R I K S R F Q R R I Q G H G C P H G C S S F S R P T G I S T G L V K L N K F G P S
L C K E Q M P V C T V I Q R M S D I I P R G A L K A A I Q G A L C Q G C Q L K G Y T I P R D E A M I L E L E Y N N L D I
W S E V E V C I A G V R S I R V I R R I A P Y G A P H G A P H G C V S R C A G L G C K K I D M P V G V Q R I Q T E I V R R
R A A H V E V T P P S S V Q Q R R I Q G H G C P H G C P H G C Q T F C V T L N R D N G Q S G R L G A Q L Y C I S Q T G P L
W T N V Q K A C T A E R A I Q G A L C Q G C Q L G C Q C A R R Y T F R Y I E P S S I G G D G I A Q T L T W L E N L E V
G E T V L M L A G T Q N I G H G A P H G C V S R C A G Q C A T L P R R Y P A S Q E T N I Q N N V G S Q V K T N I L W R G N
W K T W V H T C F N L F N P C P H G C Q T F C V T L C T T F R Y S T P T N A N G A G V L T M R N R P L T N G Q V M S E W V E S
R L A N E P P A V L T C G L G C C A R Y T F R Y P T T G N A N G A G V L T M R N R P L T N G Q V M S E W V E S
W F T V D L K I S L D T R G Q C A T L P R R Y P A R Y P A Y T N D N G N E K N T F E W C N S T F L L I Q P T L Y F E L
G V C H T I C V L T N N R A C T F R Y S T P T N T P A N T N R T I N E T I W N H N G Q S E E K L T L K L W W I D I A E A

```

FIGURE 54A

DNA sequence of modified Env including multi-clade V3 loops, Tat and Rev
[SEQ ID NO: 54]:

gaattctgcaacaactgctgtttatccattttcagaattgggtgtcgacatagcagaat
aggcgttactcgacagaggagagcaagaa**atgg**agccagtagatcctagactagagccc

Tat1

tggaagcatccaggaagtcagccta~~aa~~aactgcttgtaccaattgctattgtaaaaagtg
ttgctttcattgccaagtttgtttcatacaaaagccttaggcatctcct**atgg**cagga

Rev1

agaagcggagacagcgacgaagacctcctcaaggcagtcagactcatcaagtttctcta
tcaaagcagtaagtagtacatgtaatgcaacctatacaaatagcaatagtagcattagt
agtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatataggaaaa
tattaagacaaagaaaaatagacaggttaattgatagactaatagaaagagcagaagac
agtggca**atg**agagtggaaggagaaatatcagcacttgtggagatgggggtggagatggg

Envelope

Gcaccatgctccttgggatgttgatgatctgtagtgtacagaaaaattgtgggtcaca
gtctattatggggtacctgtgtggaaggaagcaaccaccactctattttgtgcatcaga
tgctaaagcatatgatacagaggtacataatgtttgggccacacatgcctgtgtaccca
cagaccccaaccacaagaagtagtattggtaaatgtgacagaaaaattttaacatgtgg
aaaaatgacatggtagaacagatgcatgaggatataatcagtttatgggatcaaagcct
aaagccatgtgtataaaattaacccactctgtgtt**ggagctgg**tagttgtaacacctca

Delete V1V2, insert Gly,ala,gly

gtcattacacaggcctgtccaaaggatatcctttgagccaattcccatacattattgtgc
cccggtgtgttttgcgattctaaaatgtaataataagacgttcaatggaacaggaccat
gtacaaatgtcagcacagtacaatgtacacatggaattaggccagtagtatcaactcaa
ctgctgttaaattggcagctctggcagaagaagaggtagtaattagatctgccaatttcac
agacaatgctaaaaccataatagtacagctgaaccaatctgtagaaattaatt**gt**tacaa
g

First multi-clades repeat

Acccaacaacaatacaagaaaaagtatccgtatccagagaggaccagggagagcatttg
ttacaataggaaaaataggaaatatgagacaagcacattgtctcggtgtaccagacct
aacaacaatacaagaaaaagtgtagctataggaccaggacaaacattctatgcaacagg
tgatataataggggatataagacaagcacattgttgtacgagaccaacaataatacaa
gaaaaagtataaggataggaccaggacaagcattctatgcaacaggagaaataatagga
gatataagacaagcacattgttgcacaaggccctacaacaataataagacaaaggacccc
cataggactagggcaagcactctatacaacaagaagaatagaagatataagaagagcac
attgttgtaccagaccctccaccaatacaagaacaagtatacgtataggaccaggacaa
gtattctatagaacaggagacataacaggagatataagaaaagcatattgtggatcctg
tacaagacccaacaacaatacaagaaaaagaatatctttaggaccaggacgagtatttt
atacagcaggagaaataataggagacatcagaaaggcacattgttgtaccagacctaat
aacaatacaagaaaaagataacttttgcaccaggacaagcgctctatgcaacagggtga
aataataggagatataagacaagcacattgtctcggt**gt**taccagacctacaacaata

Second multi-clade repeat

caagaaaaagtgtagctataggaccaggacaaacattctatgcaacagggtgatataata
ggggatataagacaagcacattgttgtacgagaccaacaataatacaagaaaaagtat

FIGURE 54A-continued

aaggataggaccaggacaagcattctatgcaacaggagaaaataataggagatataagac
aagcacattgttgcacaaggccctacaacaatataagacaaaaggacccccataggacta
gggcaagcactctatacaacaagaagaatagaagatataagaagagcacattgttgtag
cagaccctccaccaataacaagaacaagtatacgtataggaccaggacaagtattctata
gaacaggagacataacaggagatataagaaaagcatattgtggatcctgtacaagacc
aacaacaataacaagaaaaagaatatcttttaggaccaggacgagtattttatacagcagg
agaaataataggagacatcagaaaaggcacattgttgtaccagacctaataacaatacaa
gaaaaagtataacttttgcaccaggacaagcgctctatgcaacagggtgaaataatagga
gatataagacaagcacattgtctcgggaacattagtagagcaaaatggaataacacttt

AvaI site, end of two multi-clade repeat

Aaaacagatagatagcaaattaagagaacaattttgaaaataataaaaacaataatcttta
agcagtcctcaggaggggacccagaaattgtaacgcacagttttaattgtggaggggaa
tttttctactgttaattcaacacaactgtttaatagtacttggtttaatagtacttgag
tactaaagggtcaaataacactgaaggaagtgcacacatcacctcccatgcagaataa
aacaattataaacatgtggcagggaagttaggaaaagcaatgtatgcccctcccatcagt
ggacaaattagatgttcatcaaataattacagggtgctattaacaagagatggtggttaa
tagcaacaatgagtcagagatcttcagacctggaggaggagatatgagggacaattgga
gaagtgaattatataaaatataaagttagtaaaaattgaaccattaggagtagcacccacc
aaggcaaagagaagagtgtgtgcagactagtgcagtgagggaataggagctttgttccttgg

Delete the cleavage site, insert SpeI

gttcttgggagcagcaggaagcactatgggctgcacgtcaatgacgctgacggtacagg
ccagacaattattgtctgatatagtgcagcagcagaacaatttgctgagggctattgag
gcgcaacagcatctgttgcaactcacagctctggggcatcaaacagctccaggcaagaat
cctggctgtggaaagatacctaaaggatcaacagctcctggggatttgggggttgcctg
gaaaactcatttgcaccactgctgtgccttggaatgctagttaggagtaataaatctctg
gaacagatttggaaataacatgacctggatggagtgggacagagaaattaacaattacac
aagcttaatacactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaag
aattattggaattagataaaatgggcaagtttgtggaattggtttaacataacaattgg
ctgtggtatataaaattattcataatgatagtaggaggcttggtagggtttaagaatagt
ttttgctgtactttctatagtgaatagagttaggcagggatattcaccattatcgtttc
agaccacactcccaatcccagggggacccgacaggcccgaaaggaatagaagaagaagg
ggagagagagacagagacagatccattcgattagtgaacggatccttagcacttatctg
ggacgatctgaggagcctgtgcctcttcagctaccaccgcttgagagacttactcttga
ttgtaacgaggattgtggaacttctgggacgcagggggtgggaagccctcaaattattgg
tggaatctcctacagtattggagtcaggaactaaagaatagtgtgttaacttgctcaa
tgccacagccatagcagtagctgagtaa

gp41, but 99 bp truncation at C-terminal

FIGURE 54B

**Amino acid sequence of modified Env including multi-clade V3 loops, Tat and Rev
[SEQ ID NO: 55]:**

```

M T A A E I V S K V G A P F T F R Y P T T G N A N G N T N G N R T T I R I N K S S E S S L A G V R Q L N M E K K V T G L D E N
R M V S C N S G Q S K N V R Y A T N D N G N E I R I Q D I R I K S D I T K G S E N E L L H G I A L G A E E W L L S
L Y D V F A E N C L T N P A N R T I N E I T I R I Q D I R I K G S D I T K G S E N E L L H G I A L G A E E W L L S
L Y A P N W G P I K H E I T G N G N E I T I R I Q D I R I K G S D I T K G S E N E L L H G I A L G A E E W L L S
E G K T M D S I K H E I T G N G N E I T I R I Q D I R I K G S D I T K G S E N E L L H G I A L G A E E W L L S
K M V A D W Q C P T F I E V R K N D T I R I Q D I R I K G S D I T K G S E N E L L H G I A L G A E E W L L S
Y L P Y P K S N I F E V R K N D T I R I Q D I R I K G S D I T K G S E N E L L H G I A L G A E E W L L S
Q M V D N N L T H N R V L S G R I K G S D I T K G S E N E L L H G I A L G A E E W L L S
H I W T P D K S Y C T V I Q R M S D I R I Q D I R I K G S D I T K G S E N E L L H G I A L G A E E W L L S
L C K E Q M P V C I A G V R S I R I Q D I R I K G S D I T K G S E N E L L H G I A L G A E E W L L S
W S E V E V C I A G V R S I R I Q D I R I K G S D I T K G S E N E L L H G I A L G A E E W L L S
R A A H V E V T P A C T A E R A I Q D I R I K G S D I T K G S E N E L L H G I A L G A E E W L L S
W T N V Q K Q A C T A E R A I Q D I R I K G S D I T K G S E N E L L H G I A L G A E E W L L S
G E T V L M L A G T Q N I G H G A P H G C V S R C A G Q C A T L R Y S T P T N T R T I N E T I W N H N G Q S E E K L T L K L W I D I A Q E A R W K
W K T W V H T C F N L F N P C P H G C Q T F C V T L C C T F R Y P T T G N A N G N E K N T F E W C N S T F L I Q P T L L Y F E L L G L *
R L A N E P P A V L T C G L G C C A T L R Y P A R Y P A Y T T N D N G N E K N T F E W C N S T F L I Q P T L L Y F E L L G L *
W F T V D L K I S L D T R A C T F R Y S T P T N T R T I N E T I W N H N G Q S E E K L T L K L W I D I A Q E A R W K
G V C H T I C V L T N N R A C T F R Y S T P T N T R T I N E T I W N H N G Q S E E K L T L K L W I D I A Q E A R W K

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20449 550000

[illegible][illegible][illegible][illegible][illegible][illegible]

FIGURE 56A

DNA sequence of HIV-1 (strain BH10) Gag-PI [SEQ ID NO: 58]:

Atgggtgagagagcgtagcagttattaagcgggggagaattagatcgatgggaaaaaattcg
gttaaggccagggggaaagaaaaaatataaattaaaacatatagtagtgggcaagcaggg
agctagaacgattcgtagttaatcctggcctgttagaacaatcagaaggctgtagacaa
atactgggacagctacaaccatcccttcagacaggatcagaagaacttagatcattata
taatacagtagcaaccctctattgtgtgcatcaaaggatagagataaaagacaccaagg
aagcttttagacaagatagaggaagagcaaaacaaaagtaagaaaaagcacagcaagca
gcagctgacacaggacacagcagtcaggtcagccaaaattaccctatagtgagaaacat
ccaggggcaaatggtacatcaggccatatacctagaacttttaaatgcatgggtaaaag
tagtagaagagaaggctttcagcccagaagtaatacccatgttttcagcattatcagaa
ggagccaccccaagattttaaacaccatgctaaacacagtggggggacatcaagcagc
catgcaaatgttaaaagagaccatcaatgaggaagctgcagaatgggatagagtacatc
cagtgcatgcagggcctattgcaccaggccagatgagagaaccaaggggaagtgcata
gcaggaactactagtacccttcaggaacaaataggatggatgacaaataatccacctat
cccagtaggagaaatttataaaagatggataatcctgggattaaataaaatagtaagaa
tgtatagccctaccagcattctggacataagacaaggaccaaagaaccttttagagac
tatgtagaccggttctataaaactctaagagccgagcaagcttcacaggaggtaaaaaa
ttggatgacagaaaccttggttggtccaaaatgcgaaccagattgtaagactattttaa
aagcattgggaccagcggtacactagaagaaatgatgacagcatgtcaggagtagga
ggaccgggccataaggcaagagttttggctgaagcaatgagccaagtaacaaatacagc
taccataatgatgcagagaggcaatttttaggaaccaagaaagatgggtaagtgtttca
attgtggcaaagaagggcacacagccagaaattgcaggggccctaggaaaaagggtgt
tggaatgtggaaaggaaggacaccaaattgaaagattgtactgagagacaggctaattt
ctttagggaagatctggccttcctacaagggaaggccagggaattttcttcagagcaga
ccagagccaacagccccaccattttcttcagagcagaccagagccaacagccccaccaga
agagagcttcagggtctggggtagagacaacaactccccctcagaagcaggagccgatag
acaaggaaactgtatccttttaacttccctcagatcactctttggcaacgaccctcgtca
caataaagataggggggcaactaaaggaagctctattagatacaggagcagatgataca
gtattagaagaaatgagtttgccaggaagatggaaacaaaaatgatagggggaattgg
aggttttatcaaagtaagacagtatgatcagatactcatagaaatctgtggacataaag
ctataggtacagtattagtaggacctacacctgtcaacataattggaagaaatctgttg
actcagattgggtgcacttttaattttta

1003335-012492

FIGURE 57

Primers for multi-clade V3 loops:

Clade A: (1). forward primer A888F5 [SEQ ID NO: 60]:

5'-aaa tca acc gga att gaa ttc cct cgg gtg tac cag acc taa caa caa tac-3'
EcoRI Aval

(2). reverse primer A-CR3 [SEQ ID NO: 61]:

5'-att gtt ggg tct cgt aca aca atg tgc ttg tct tat atc ccc-3'

Clade C: (3). forward primer A-CF5 [SEQ ID NO: 62]:

5'-ggg gat ata aga caa gca cat tgt acg aga ccc aac aat ac-3'

(4). reverse primer C980R3 [SEQ ID NO: 63]:

5'-gtt gta ggg cct tgt gca aca atg tgc ttg tct tat atc -3'

Clade D: (5). forward primer D888F5 [SEQ ID NO: 64]:

5'-gat ata aga caa gca cat tgt tgc aca agg ccc tac aac-3'

(6). reverse primer D-ER3 [SEQ ID NO: 65]:

5'-ggt gga ggg tct ggt aca aca atg tgc tct tct tat -3'

Clade E: (7). forward primer D-EF5 [SEQ ID NO: 66]:

5' -ata aga aga gca cat tgt tgt acc aga ccc tcc acc-3'

(8). reverse primer E998R3 [SEQ ID NO: 67]:

5'-gta ttg ttg ttg ggt ctt gta caa caa tat gct ttt ctt ata tct cc-3'

Clade F: (9). forward primer F888F5 [SEQ ID NO: 68]:

5'-gga gat ata aga aaa gca tat tgt tgt aca aga ccc aac aac aat ac-3'

(10). reverse primer F-GR3 [SEQ ID NO: 69]:

5'-ggt att agg tct ggt aca aca atg tgc ctt tct gat gtc-3'

Clade G: (11). forward primer F-GF5 [SEQ ID NO: 70]:

5'-gac atc aga aag gca cat tgt tgt acc aga cct aat aac-3'

(12). reverse primer G989R3 [SEQ ID NO: 71]:

5'-aat aaa cta gtc tag acc ccc gag tct aga aca atg tgc ttg tct tat atc tcc-3'
Aval XbaI